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LOW-LEVEL RADIOACTIVE WASTE DISPOSAL

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY RESEARCH AND DEVELOPMENT

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES

AND THE

SUBCOMMITTEE ON NUCLEAR REGULATION

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

NINETY-NINTH CONGRESS

FIRST SESSION

ON

S. 1517 AND S. 1578

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LOW-LEVEL RADIOACTIVE WASTE DISPOSAL

TUESDAY, OCTOBER 8, 1985

U.S. SENATE, SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT, COMMITTEE ON ENERGY AND NATURAL RESOURCES; AND SUBCOMMITTEE ON NUCLEAR REGULATION, COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,

Washington, DC.

The subcommittees met, pursuant to notice, at 10:10 a.m., in room SD-366, Dirksen Office Building, Hon. Pete Domenici and Hon. Alan K. Simpson presiding.

Present: Senators Simpson, Domenici, McClure, Warner, Hecht, Evans, Ford, Stafford, and Symms.

OPENING STATEMENT OF HON. ALAN K. SIMPSON, A U.S. SENATOR FROM THE STATE OF WYOMING

Senator SIMPSON. The hearing will come to order. I apologize for the delay. Senator Thurmond and I hoped to avoid the delay, but we were meeting this morning on the serious issue of the debt limit extension and deficit reduction.

We have today, a joint session of two subcommittees to consider the very serious issue of low-level radioactive waste disposal.

In 1980, we passed the Low-Level Radioactive Waste Policy Act which established the framework for the States and the Federal Government, working together, to address the issue of low-level waste disposal. Under that act, the States were authorized to enter into regional compacts for the purpose of providing for safe, effective, and efficient disposal of low-level waste on a regional basis, with each region being responsible for disposal of its own waste.

So, pursuant to that act, the States have been negotiating among themselves for the past 5 years, formulating these regional compacts called for by the Congress. Considerable progress has been made, and we now have 7 compacts, covering 37 States pending before the Congress for approval. But notwithstandng those efforts—and the efforts of the Senator from South Carolina are extraordinary, likewise for every other group involved—yet it still appears that the January 1, 1986 deadline set by Congress in 1980 for all compacts to be in place will not be met.

So today we need to consider what courses of action we should take in regard to those compacts that have been already submitted and determine what interim measures might be taken to ensure that the remaining States move forward very promptly to assume responsibility for the wastes generated in their States.

With that, the focus today will be on the proposal introduced by my friend, Senator Strom Thurmond, to break the impasse that has developed between the sited and unsited regions by providing for some limited interim access to the existing sites in exchange for commitments on the part of those regions without compacts to move forward promptly with development of the sites.

I want to pay special tribute and thanks and deep appreciation to the efforts of the Senator from South Carolina, the President pro tempore of the Senate, my friend, my mentor. He has been a dedicated advocate of the regional approach to the low-level waste disposal efforts, and without his guidance we would not be where we are today, or even here at all.

With that, I will appreciate hearing anything you wish to share with us, Senator Thurmond. It's nice to have you here, sir.

[The texts of S. 1517 and S. 1578 follow:]

II

99TH CONGRESS
1ST SESSION

S. 1517

To amend the Low-Level Radioactive Waste Policy Act of 1980 to authorize continued financial and technical assistance of the Department of Energy to the regional low-level waste compact regions, and to revise the guidelines and procedures for the establishment and use of regional disposal facilities for low-level radioactive waste, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JULY 29 (legislative day, JULY 16), 1985

Mr. MCCLURE introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To amend the Low-Level Radioactive Waste Policy Act of 1980 to authorize continued financial and technical assistance of the Department of Energy to the regional low-level waste compact regions, and to revise the guidelines and procedures for the establishment and use of regional disposal facilities for low-level radioactive waste, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the "Low-Level Radioactive Waste Policy Act Amendments of 1985".

SEC. 2. The Low-Level Radioactive Waste Policy Act (42 U.S.C. 2021b et seq.) is amended by striking out section 4 and inserting in lieu thereof the following:

"SEC. 4. (a) It is the policy of the Federal Government that—

"(1) each State is responsible for providing for the availability of capacity either within or outside the State for the disposal of low-level radioactive waste generated within its borders except for waste generated as a result of defense, and

"(2) low-level radioactive waste can be most safely and efficiently managed on a regional basis.

"(b) To carry out the policy set forth in paragraph (a), the States may enter into such compacts as may be necessary to provide for the establishment and operation of regional disposal facilities for low-level radioactive waste.

"(c) A compact entered into under subparagraph (1) shall not take effect until the Congress has by law consented to the compact. Each such compact shall provide that every five years after the compact has taken effect the Congress may by law withdraw its consent.

"DEPARTMENT OF ENERGY FINANCIAL AND TECHNICAL ASSISTANCE

"SEC. 5. (a) The Secretary shall, to the extent provided in appropriations Acts, provide to compact regions, States that are members of compacts, and States that are not members of compacts, that are determined by the Secretary to require assistance for purposes of carrying out this Act—

"(1) continuing technical assistance to assist them in fulfilling their responsibilities under this Act. Such technical assistance shall include, but not be limited to, technical guidelines for site selection, alternative technologies for low-level radioactive waste disposal, volume reduction options, management techniques to reduce low-level waste generation, transportation practices for shipment of low-level wastes, and health and safety considerations in the storage, shipment, and disposal of low-level radioactive wastes, and

"(2) at least through the end of fiscal year 1993, financial assistance to assist them in fulfilling their responsibilities under this Act.

"(b) The Secretary shall prepare and submit a report to Congress on an annual basis which (1) summarizes the progress of low-level waste disposal siting and licensing activities within each compact region, (2) reviews the available volume reduction technologies, their applications, effectiveness, and costs on a per unit volume basis, (3) reviews interim storage facility requirements, costs, and usage, (4) summarizes transportation requirements for such wastes on an inter- and intra-regional basis, (5) summarizes the data on the total amount of low-level wastes generated on a yearly basis, the proportion of such wastes that underwent volume reduction, the average volume reduction attained, and the proportion of wastes stored on an interim basis, and (6) projects the interim storage and final disposal volume requirements anticipated for the upcoming year, on a regional basis.

"APPLICABILITY TO FEDERAL REGULATIONS

"SEC. 6. Nothing contained in this Act or any compact may be construed to limit the applicability of any Federal law or to diminish or otherwise impair the jurisdiction of any Federal agency, including the regulatory responsibilities of the Nuclear Regulatory Commission and the Department of Transportation.

"LIMITED AVAILABILITY OF REGIONAL DISPOSAL FACILITIES FOR LOW-LEVEL RADIOACTIVE WASTE GENERATED OUTSIDE COMPACT REGION

"SEC. 7. (a) IN GENERAL.—Subject to the limitations in subsection (b), each compact region that has a regional disposal facility in operation before January 1, 1985, shall, before the expiration of the three-month period following the date of the enactment of the Low-Level Radioactive Waste Policy Amendments of 1985, offer to enter into agreements with any compact region that does not have such a regional disposal facility in operation (and with any State that is not a member of a compact region and does not have a low-level radioactive waste disposal facility in operation) to allocate all available disposal capacity to such compact regions (and States) through January 1, 1993, for the disposal of low-level radioactive waste generated in such compact regions (and States). Each such offer to enter into agreements shall remain available for not less than a nine-month period.

"(b) LIMITATIONS.—The availability of regional disposal facilities under subsection (a) shall be subject to the following limitations:

"(1) The regional disposal facility located at Barnwell, in the State of South Carolina, shall not be required under subsection (a) in any year beginning after December 31, 1985, to dispose of more than sixty per centum of the number of cubic feet of low-level radioactive waste received for disposal at such facility from outside the compact region in 1983.

"(2) The regional disposal facility located at Hanford, in the State of Washington, shall not be required under subsection (a) in any year beginning after December 31, 1985, to dispose of more than sixty per centum of the number of cubic feet of low-level radioactive waste received for disposal at such facility from outside the compact region in 1983.

"(3) The regional facility located at Beatty, in the State of Nevada, shall not be required under subsection (a) in any year beginning after December 31, 1985, to dispose of more than one hundred and fifty thousand cubic feet of low-level radioactive waste.

"(c) SURCHARGES.—(1) Each agreement entered into under subsection (a) may provide for a surcharge on any low-level radioactive waste disposed of under such agreement that is not in excess of the limits established in subsection (b). Such surcharge shall be in addition to the fees generally applicable for disposal of low-level radioactive waste in the disposal facility involved, and may not exceed $5 per cubic foot of low-level radioactive waste.

"(2) Each agreement entered into under subsection (a) may provide for a surcharge on any low-level radioactive waste disposed of under such agreement that is in excess of the limits established in subsection (b). Such surcharge shall be in addition to the fees generally applicable for disposal of low-level radioactive waste in the disposal facility involved, and may not exceed $10 per cubic foot of low-level radioactive waste.

"(d) NONDISCRIMINATION.—Except as provided in subsections (b) and (c), low-level radioactive waste disposed of under an agreement entered into under subsection (a) shall be subject without discrimination to all applicable legal requirements of the compact region and State in which the disposal facility is located as if such low-level radioactive waste were generated within such compact region.

"(e) RECIPROCITY.—Each compact region that does not have a regional disposal facility and that enters into an agreement under subsection (a) shall be required to accept wastes from the State with whom such an agreement has been made, the amount of such wastes to be equivalent to the aggregate wastes shipped prior to January 1, 1993, from the nonsited compact region that is in excess of the amounts as defined under subsection (b).

"(f) LIMITATION ON ACCESS TO EXISTING DISPOSAL FACILITIES.—If any nonsited compact region or nonmember State fails to ratify compact legislation or fails to enact legislation to develop its own disposal facility by July 1, 1986, any low-level radioactive waste generated within such nonsited compact region or nonmember State may be denied access to the existing regional disposal facilities.

II

99TH CONGRESS
1ST SESSION

S. 1578

To amend the Low-Level Radioactive Waste Policy Act to improve procedures for the implementation of compacts providing for the establishment and operation of regional disposal facilities for low-level radioactive waste, and for other purposes.

IN THE SENATE OF THE UNITED STATES

AUGUST 1 (legislative day, JULY 16), 1985

Mr. THURMOND (for himself, Mr. KENNEDY, Mr. DENTON, Mr. GORTON, Mr. SYMMS, Mr. GORE, Mr. MATTINGLY, Mr. LAXALT, Mr. MCCONNELL, Mr. HECHT, Mr. HATFIELD, Mr. PACKWOOD, Mr. MATSUNAGA, Mr. STEVENS, Mr. SPECTER, Mr. MURKOWSKI, Mr. HATCH, Mr. EVANS, Mr. WALLOP, Mr. EAST, Mr. CHILES, Mr. INOUYE, Mr. HELMS, Mr. SIMPSON, and Mr. HOLLINGS) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

---

A BILL

To amend the Low-Level Radioactive Waste Policy Act to improve procedures for the implementation of compacts providing for the establishment and operation of regional disposal facilities for low-level radioactive waste, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Low-Level Radioactive Waste Policy Amendments Act of 1985".

SEC. 2. The Low-Level Radioactive Waste Policy Act (42 U.S.C. 2021b et seq.) is amended by striking out sections 2, 3, and 4 and inserting in lieu thereof the following:

"DEFINITIONS

"SEC. 2. For purposes of this Act:

"(1) The term 'activity of the Secretary' means any activity of the Secretary of Energy that is conducted at an atomic energy defense, research and development, or demonstration installation or institution owned by and operated principally for the Department of Energy or its successor.

"(2) The term 'agreement State' means a State that—

"(A) has entered into an agreement with the Nuclear Regulatory Commission under section 274 of the Atomic Energy Act of 1954 (42 U.S.C. 2021); and

"(B) has authority to regulate the disposal of low-level radioactive waste under such agreement.

"(3) The term 'atomic energy defense activity' means any activity of the Secretary of Energy performed in whole or part in carrying out any of the following functions:

"(A) naval reactors development, propulsion, and decommissioning;

"(B) weapons activities including defense inertial confinement;

"(C) verification and control technology;

"(D) defense nuclear materials production;

"(E) defense nuclear waste and materials byproducts management;

"(F) defense nuclear materials security and safeguards and security investigations; and

"(G) defense research and development, other than that described in subparagraphs (A) through (F).

"(4) The terms 'atomic weapon', 'byproduct material', 'source material', and 'special nuclear material' have the meanings given such terms in section 11 of the Atomic Energy Act of 1954 (42 U.S.C. 2014), as such section is in effect on January 1, 1985.

"(5) The term 'commercial nuclear power reactor' means any unit of a civilian nuclear powerplant required to be licensed under section 103 or 104 b. of the Atomic Energy Act of 1954 (42 U.S.C. 2133 or 2134(b)).

"(6) The term 'compact' means a compact entered into by two or more States pursuant to this Act.

"(7) The term 'compact commission' means the regional commission, committee, or board established in a compact to administer such compact.

"(8) The term 'compact region' means the area consisting of all States that are members of a compact.

"(9) The term 'disposal' means the isolation of low-level radioactive waste pursuant to the requirements established by the Nuclear Regulatory Commission under applicable laws, or by an agreement State if such isolation occurs in such agreement State.

"(10) The term 'Federal research and development activity' means any activity of the Secretary of Energy that is not an atomic energy defense activity specified in paragraph (3).

"(11) The term 'generate', when used in relation to low-level radioactive waste, means to produce new low-level radioactive waste.

"(12) The terms 'high-level radioactive waste' and 'spent nuclear fuel' have the meanings given such terms in section 2 of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101), as such section is in effect on January 1, 1985.

"(13) The term 'low-level radioactive waste' means radioactive material that—

"(A) is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or byproduct material (as defined in section 11e.(2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(e)(2)) as in effect on January 1, 1985); and

"(B) the Nuclear Regulatory Commission, consistent with existing law, classifies as low-level radioactive waste.

"(14) The term 'non-sited compact region' means any compact region that is not a sited compact region.

"(15) The term 'regional disposal facility' means a low-level radioactive waste disposal facility in operation on January 1, 1985, or subsequently established and operated under a compact.

"(16) The term 'Secretary' means the Secretary of Energy.

"(17) The term 'sited compact region' means a compact region in which there is located one of the regional disposal facilities at Barnwell, in the State of South Carolina; Richland, in the State of Washington; or Beatty, in the State of Nevada.

"(18) The term 'State' means any State of the United States, the District of Columbia, and, subject to the provisions of Public Law 96-205, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, the

Northern Mariana Islands, the Trust Territory of the Pacific Islands, and any other territory or possession of the United States.

"(19) The term 'transuranic waste' means radioactive waste contaminated with concentrations of transuranic elements greater than the limit for transuranic waste established by rule by the Nuclear Regulatory Commission.

"RESPONSIBILITIES FOR DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE

"SEC. 3. (a) STATE RESPONSIBILITIES.—Each State shall be responsible for providing, either by itself or in cooperation with other States, for the disposal of—

"(1) low-level radioactive waste generated within the State (other than by the Federal Government) that consists of or contains class A, B, or C, radioactive waste as defined by section 61.55 of title 10, Code of Federal Regulations, as in effect on December 27, 1982;

"(2) low-level radioactive waste described in paragraph (1) that is generated by the Federal Government, except that any State shall not be required to, but may, provide for disposal of any such waste that results from an activity of the Secretary or the research, development, testing, or production of any atomic weapon; and

"(3) low-level radioactive waste described in paragraphs (1) and (2) and required to be accepted for disposal under section 5.

"(b) FEDERAL RESPONSIBILITIES.—(1) The Federal Government shall be responsible for ensuring the safe disposal of—

"(A) high-level radioactive waste and spent nuclear fuel, in accordance with the provisions of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101 et seq.);

"(B) low-level radioactive waste generated as a result of any activity of the Secretary; and

"(C) low-level radioactive waste generated as a result of any research, development, testing, or production of any atomic weapon.

"(2)(A) Not later than the expiration of the 12-month period following the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985, the Secretary shall submit to the Congress a comprehensive report setting forth recommendations of the Secretary to ensure the safe disposal of any radioactive waste for which—

"(i) disposal is not provided under other Federal law in effect on the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985; and "(ii) the Secretary determines that no disposal as low-level waste may not be viable.

"(B) Such report shall include—

"(i) an identification of the radioactive waste for which neither the Federal Government nor the States have responsibility under existing Federal law, except for byproduct material as defined in section 11e.(2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(e)(2)), as in effect on January 1, 1985;

"(ii) an identification of Federal and non-Federal options for disposal of such radioactive waste;

"(iii) a description of the actions proposed to ensure the safe disposal of such radioactive waste;

"(iv) a description of the projected costs of taking such actions; and

"(v) recommendations of the Secretary for resolving the issues related to disposal of radioactive waste described in subparagraph (A).

"REGIONAL COMPACTS FOR DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE

"SEC. 4. (a) IN GENERAL.—(1) It is the policy of the Federal Government that the responsibilities of the States under section 3 for the disposal of low-level radioactive waste can be most safely and efficiently managed on a regional basis.

"(2) To carry out the policy set forth in paragraph (1), the States may enter into such compacts as may be necessary to provide for the establishment and operation of regional disposal facilities for low-level radioactive waste.

"(b) APPLICABILITY TO FEDERAL ACTIVITIES.—(1)(A) Except as provided in subparagraph (B), no compact or action taken under a compact shall be applicable to the transportation, management, or disposal of low-level radioactive waste generated by activities of the Secretary.

"(B) Low-level radioactive waste generated by the Federal Government that is disposed of at a regional disposal facility or disposal facility within a State which is not a member of a compact shall be subject to the same conditions, regulations, requirements, fees, taxes, and surcharges imposed by the compact commission, and by the State in which such facility is located, in the same manner and to the same extent as any low-level radioactive waste not generated by the Federal Government.

"(2) Any low-level radioactive waste disposal facility established or operated exclusively for the disposal of low-level radioactive waste produced by the Federal Government shall not be subject to any compact or any action taken under a compact.

"(3) Nothing contained in this Act or any compact may be construed to confer any new authority on any compact commission or State—

"(A) to regulate the packaging or transportation of low-level radioactive waste in a manner inconsistent with the regulations of the Nuclear Regulatory Commission or the Department of Transportation;

"(B) to regulate health, safety, or environmental hazards from source material, byproduct material, or special nuclear material;

"(C) to inspect the facilities of licensees of the Nuclear Regulatory Commission;

"(D) to inspect security areas or operations at the site of the generation of any low-level radioactive waste by the Federal Government, or to inspect classified information related to such areas or operations; or

"(E) to require indemnification beyond the provisions of chapter 171 of title 28, United States Code (commonly referred to as the Federal Tort Claims Act), or section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210) (commonly referred to as the Price-Anderson Act), whichever is applicable.

"(4) Nothing contained in this Act or any compact may be construed to limit the applicability of any Federal law or to diminish or otherwise impair the jurisdiction of any Federal agency, including the regulatory responsibilities of the Nuclear Regulatory Commission and the Department of Transportation.

"(c) EFFECTIVENESS OF AUTHORITIES UNDER COMPACT.—(1) Except as provided in paragraphs (2) and (3), each compact shall take effect in accordance with the provisions of the compact.

"(2) Any authority in a compact to restrict the use of the regional disposal facilites under the compact to the disposal of low-level radioactive waste generated within the compact region shall not take effect before each of the following occurs:

"(A) January 1, 1986; and

"(B) the Congress by law consents to the compact.

"(3) Any authority in a compact to restrict low-level radioactive waste generated within the compact region from being transported or disposed of outside the compact region shall not take effect before the Congress has by law consented to the compact.

"(d) CONGRESSIONAL REVIEW.—Each compact shall provide that every 5 years after the compact has taken effect the Congress may by law withdraw its consent.

“LIMITED AVAILABILITY OF CERTAIN REGIONAL DISPOSAL FACILITIES DURING TRANSITION AND LICENSING PERIODS

“SEC. 5. (a) AVAILABILITY OF DISPOSAL CAPACITY.—(1) Subject to the provisions of subsections (b) through (k), each State in which there is located a regional disposal facility referred to in paragraphs (1) through (3) of subsection (b) shall make disposal capacity available for low-level radioactive waste generated by pressurized-water and boiling-water commercial nuclear power reactors in accordance with the allocations established in subsections (c) and (e).

“(2) Subject to the provisions of subsections (b) through (k), each State in which there is located a regional disposal facility referred to in paragraphs (1) through (3) of subsection (b) shall make disposal capacity available for low-level radioactive waste generated by any source not referred to in paragraph (1).

“(3) Before the expiration of the 3-month period following the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985, the 3 States in which there is located a regional disposal facility referred to in paragraphs (1) through (3) of subsection (b) shall enter into an agreement with each other to establish which disposal facility shall accept low-level radioactive waste from which generators of such waste. Under such agreement such States—

"(A) may assign generators to such regional disposal facilities individually, region-by-region, or by any other method such States determine to be appropriate; and

"(B) shall provide a method for assigning disposal capacity to any generator of low-level radioactive waste not specifically provided for in such agreement.

"(4) Such States shall submit the agreement entered into under paragraph (3) to the compact commission for each sited compact region for such approval as may be required under the terms of the respective compacts for the disposal of waste generated outside such compact region at the regional disposal facility located in such State.

"(5) The agreement entered into under paragraph (3) shall not be required to receive any additional consent of the Congress.

"(6) The allocation provisions of this section shall not affect the distribution of low-level radioactive waste before January 1, 1986, or 30 days after the States referred to in paragraph (2) enter into the agreement referred to in paragraph (3), whichever is later.

"(7) No provision of this section shall be construed to obligate any disposal facility or State referred to in paragraphs (1) through (3) of subsection (b) to accept low-level radioactive waste from any source in the event that any such facility ceases operation.

"(b) LIMITATIONS.—The availability of disposal capacity for low-level radioactive waste from any source under subsection (a) shall be subject to the following limitations:

"(1) The regional disposal facility located at Barnwell, in the State of South Carolina, shall not be required to dispose of more than a total of 8,400,000 cubic feet of low-level radioactive waste during the 7-year period beginning January 1, 1986, and ending December 31, 1992 (as based on an average annual volume of 1,200,000 cubic feet of low-level radioactive waste).

"(2) The regional disposal facility located at Richland, in the State of Washington, shall not be required to dispose of more than a total of 9,800,000 cubic feet of low-level radioactive waste during the 7-year period beginning January 1, 1986, and ending December 31, 1992 (as based on an average annual volume of 1,400,000 cubic feet of low-level radioactive waste).

"(3) The regional disposal facility located at Beatty, in the State of Nevada, shall not be required to dispose of more than a total of 1,400,000 cubic feet of low-level radioactive waste during the 7-year period beginning January 1, 1986, and ending December 31, 1992 (as based on an average annual volume of 200,000 cubic feet of low-level radioactive waste).

"(c) Utility Allocations During 4-Year Transition Period.—(1) Each commercial nuclear power reactor licensed to operate at full power before September 1, 1984, and in operation for not less than any 15-month period beginning on or after October 1, 1984, shall be allocated the following amount of disposal capacity available under subsection (b) for the 4-year period beginning January 1, 1986, and ending December 31, 1989:

"(A) Each pressurized-water reactor within a sited compact region shall be allocated 49,308 cubic feet of low-level radioactive waste disposal capacity.

"(B) Each pressurized-water reactor, other than those referred to in subparagraph (A), shall be allocated 41,832 cubic feet of low-level radioactive waste disposal capacity.

"(C) Each boiling-water reactor within a sited compact region shall be allocated 110,400 cubic feet of low-level radioactive waste disposal capacity.

"(D) Each boiling-water reactor, other than those referred to in subparagraph (C), shall be allocated 93,662 cubic feet of low-level radioactive waste disposal capacity.

"(2) Each commercial nuclear power reactor licensed to operate at full power after September 1, 1984, and in operation for not less than any 15-month period after issuance of the full power license beginning on or after October 1, 1984, shall be allocated the following amount of low-level radioactive waste disposal capacity available under subsection (b) for each month of operation during the 4-year period beginning January 1, 1986, and ending December 31, 1989 beginning with the sixteenth month following the date such reactor received it's full power operating license:

"(A) Each pressurized-water reactor within a sited compact region shall be allocated 1,027 cubic feet of low-level radioactive waste disposal capacity.

"(B) Each pressurized-water reactor, other than those referred to in subparagraph (A), shall be allocated 871 cubic feet of low-level radioactive waste disposal capacity.

"(C) Each boiling-water reactor within a sited compact region shall be allocated 2,300 cubic feet of low-level capacity.

"(D) Each boiling-water reactor, other than those referred to in subparagraph (C), shall be allocated 1,952 cubic feet of low-level radioactive waste disposal capacity.

"(3) For the purposes of this subsection and subsection (e), the term 'month of operation' shall include the entire sixteenth calendar month after a commercial nuclear power reactor receives its full power operating license and any month during which a commercial nuclear power reactor does not produce power by reason of ordinary maintenance.

"(4) The allocations of disposal capacity made under this subsection for any commercial nuclear power reactor may be used by the owner or operator of such reactor at any time during the 4-year period involved. The owner or operator of more than one commercial nuclear power reactor may apportion the aggregate of its allocations under this subsection among such reactors as it determines to be appropriate.

"(5) Any State may, in accordance with its compact, accept low-level radioactive waste in excess of the allocations described in this subsection. Notwithstanding subsection (b), a State shall not reduce any allocation provided in this subsection.

"(d) REQUIREMENTS FOR ACCESS TO REGIONAL DISPOSAL FACILITIES.—(1) Each non-sited compact region, or State that is not a member of a compact region and does not have an operating regional disposal facility, shall comply with the following requirements:

"(A) By July 1, 1986, each such non-member State shall ratify compact legislation or enact legislation indicating its intent to develop a site for the location of a low-level radioactive waste disposal facility within such State.

"(B) By January 1, 1988—

"(i) each non-sited compact region shall identify the State in which its low-level radioactive waste disposal facility is to be located and each compact region or the State in which its low-level radioactive waste disposal facility is to be located shall develop a siting plan for such facility and delegate authority to implement such plan; and

"(ii) each non-member State shall develop a siting plan for a low-level radioactive waste disposal facility and delegate authority to implement such plan.

"(C) By January 1, 1990, a complete application (as determined by the Nuclear Regulatory Commission or appropriate agency of an agreement State) shall be filed for a license to operate a low-level radioactive waste disposal facility within each non-sited compact region or within each non-member State.

"(2) If any non-sited compact region or non-member State fails to comply with any requirement of paragraph (1), any low-level radioactive waste generated within such non-sited compact region or non-member State may be denied access to the regional disposal facilities referred to in paragraphs (1) through (3) of subsection (b).

"(3) Any access to a regional disposal facility that is suspended under paragraph (2) shall be restored after the non-sited compact region or non-member State involved complies with such requirement.

"(e) ALLOCATIONS DURING 3-YEAR LICENSING AND CONSTRUCTION PERIOD.—(1) During the 3-year period beginning January 1, 1990, and ending December 31, 1992, each generator of low-level radioactive waste located within a non-sited compact region, or within a State that is not a member of a compact region, shall be provided the disposal capacity described in paragraphs (2) and (3) for such low-level radioactive waste in the regional disposal facilities referred to in paragraphs (1) through (3) of subsection (b) if a complete application (as determined by the Nuclear Regulatory Commission or appropriate agency of an agreement State) has been filed for a license to operate a low-level radioactive waste disposal facility within such non-sited compact region or non-member State.

"(2) Each commercial nuclear power reactor allocated disposal capacity under subsection (c) or licensed to operate at full power after September 1, 1988, and in operation for not less than any 15-month period beginning on or after October 1, 1988, shall be allocated the following amount of low-level radioactive waste disposal capacity available under subsection (b) for each month of operation during the 3-year period referred to in paragraph (1), subject to the limitations in paragraph (4):

"(A) Each pressurized-water reactor within a sited compact region shall be allocated 934 cubic feet of low-level radioactive waste disposal capacity.

"(B) Each pressurized-water reactor, other than those referred to in subparagraph (A), shall be allocated 685 cubic feet of low-level radioactive waste disposal capacity.

"(C) Each boiling-water reactor within a sited compact region shall be allocated 2,091 cubic feet of low-level radioactive waste disposal capacity.

"(D) Each boiling-water reactor, other than those referred to in subparagraph (C), shall be allocated 1,533 cubic feet of low-level radioactive waste disposal capacity.

"(3) In addition to the allocation described in paragraph (2), any such generator may use any capacity allocated to it under subsection (c) that was not used as of December 31, 1989.

"(4) Commercial nuclear power reactors located within a non-sited compact region, or within a State that is not a member of a compact region, shall not receive an allocation under paragraph (2) for any month before such compact region or State complies with the requirements of paragraph (1).

"(5) The allocations of disposal capacity made under this subsection for any commercial nuclear power reactor may be used by the owner or operator of such reactor at any time during the 3-year period involved. The owner or operator of more than 1 commercial nuclear power reactor may apportion the aggregate of its allocations under this subsection among such reactors as it determines to be appropriate.

"(6) A State may, at its discretion, accept waste in excess of the allocations described in this subsection. Notwithstanding subsection (b), a State shall not reduce any allocation provided in this subsection.

"(f) INTER-REACTOR ASSIGNMENT OF DISPOSAL CAPACITY ALLOCATIONS.—Any commercial nuclear power reactor whose access to a regional disposal facility has not been suspended for noncompliance with the requirements of subsection (d) may assign any disposal capacity allocated to it under subsection (c) or (e) to any other commercial nuclear power reactor whose access to a regional disposal facility has not been suspended for noncompliance with the requirements of subsection (d). Such assignment—

"(1) shall be in writing (a copy of which shall be delivered to the affected compact commission and State and accompanied by the assignor's unconditional written waiver of any right to the allocation being assigned, within 10 days of the execution of such an assignment and at least 3 days prior to the delivery of any low-level radioactive waste pursuant to the assignment);

"(2) may be made for valuable consideration;

"(3) shall be invalid if the low-level radioactive waste to be disposed of under such assignment is not—

"(A) of the same general type (as determined by the appropriate regulatory agency of the State in which the recipient regional disposal facility is located) as the low-level radioactive waste originally allocated disposal capacity under the interstate agreement under subsection (a)(3); and

"(B) delivered to the disposal facility to which the low-level radioactive waste referred to in subparagraph (A) was assigned under such interstate agreement; and

"(4) shall be nullified by any event rendering either the assignor-reactor or the assignee-reactor ineligible for an allocation under subsection (c) or (e) or subject to the denial of access to a regional disposal facility under subsection (d).

"(g) Additional Allocation for Unusual Volumes of Low-Level Radioactive Waste.—(1) In January of each year from 1987 through 1992, inclusive, the 3 States in which there are located the regional disposal facilities referred to in paragraphs (1) through (3) of subsection (b) shall (in consultation with the Nuclear Regulatory Commission and operators of commercial nuclear power reactors) enter into an agreement with each other for the allocation of disposal capacity in addition to that allocated under subsections (c) and (e) among commercial nuclear power reactors whose allocation under such subsections has been inadequate over the preceding 12 months due to—

"(A) increased waste volume resulting from operation of a reactor without discharge of radioactively contaminated water; or

"(B) necessary, but irregular, maintenance or safety procedures.

"(2) No low-level radioactive waste shall be accepted for disposal under paragraph (1) unless such waste has been reduced in volume to the maximum extent technologically feasible.

"(3) The total amount allocated under this subsection during the period beginning January 1, 1987, and ending December 31, 1992, shall not exceed 794,792 cubic feet.

"(4) The agreement entered into under paragraph (1) shall not be required to receive any additional consent of the Congress.

"(h) EMERGENCY EXEMPTION.—(1) If the Governor of any State (or, for any State without a Governor, the chief executive officer of the State) determines that there exists a threat to the public health and safety that may be mitigated by exempting the disposal of any low-level radioactive waste generated in that State from any limitation, allocation, or requirements established in this section, such Governor (or chief executive officer) shall notify the Nuclear Regulatory Commission and the Governor of the State in which any applicable regional disposal facility is located of such need for an exemption.

"(2) Within 30 days of the receipt of notification under paragraph (1), the Nuclear Regulatory Commission shall determine whether there exists a threat to the public health and safety that may be mitigated by exempting the disposal of any low-level radioactive waste from any limitation, allocation, or requirement established in subsections (a) through (e).

"(3) The Governor of the State in which the applicable regional disposal facility is located shall decide whether to grant the exemption requested and, in making such decision, may take the determination of the Nuclear Regulatory Commission into consideration.

"(4) Any agreement under section 274 of the Atomic Energy Act of 1954 (42 U.S.C. 2021) shall not be applicable to the determination of the Nuclear Regulatory Commission under paragraph (2).

"(i) SURCHARGES.—The disposal of any low-level radioactive waste under this section (other than low-level radioactive waste generated in a site compact region) may be charged a surcharge by the State in which the applicable regional disposal facility is located, in addition to the fees generally applicable for disposal of low-level radioactive waste in the regional disposal facility involved. Such surcharge shall not exceed—

"(1) in 1986 and 1987, $10.00 per cubic foot of low-level radioactive waste;

"(2) in 1988 and 1989, $20.00 per cubic foot of low-level radioactive waste; and

"(3) in 1990, 1991, and 1992, $40.00 per cubic foot of low-level radioactive waste.

"(j) ADMINISTRATION.—Each State in which a regional disposal facility referred to in paragraphs (1) through (3) of subsection (b) is located shall have authority—

"(1) to monitor compliance with the limitations, allocations, and requirements established in this section; and

"(2) to deny access to any low-level radioactive waste disposal facilities within its borders to any low-level radioactive waste that—

"(A) is assigned to a facility in another State under the agreement referred to in subsection (a)(3);

"(B) is in excess of the limitations or allocations established in this section; or

"(C) is not required to be accepted due to the failure of a compact region or State to comply with the requirements of subsection (d)(1).

"(k) NONDISCRIMINATION.—Except as provided in subsections (b) through (j), low-level radioactive waste disposed of under this section shall be subject without discrimination to all applicable legal requirements of the compact region and State in which the disposal facility is located as if such low-level radioactive waste were generated within such compact region.

"ASSURANCE OF FINANCIAL RESPONSIBILITY

"SEC. 6. The Nuclear Regulatory Commission and each agreement State shall ensure that each low-level radioactive waste disposal facility licensed by the Nuclear Regulatory Commission or by such agreement State is covered by bonding or other financial assurance (from the commencement of operations through decommissioning and long-term care) that provides that all financial requirements of operating a safe and environmentally sound facility will be complied with, including any requirement for site closure and decommissioning or corrective action prior to the expected time of license termination due to economic or health and safety reasons.

"FINANCIAL AND TECHNICAL ASSISTANCE

"SEC. 7. The Secretary shall, to the extent provided in appropriation Acts, provide to compact regions, States that are members of compacts, and States that are not members of compacts, that are determined by the Secretary to require assistance for purposes of carrying out this Act—

"(1) continuing technical assistance to assist them in fulfilling their responsibilities under this Act; and

"(2) at least through the end of fiscal year 1992, financial assistance to assist them in fulfilling their responsibilities under this Act.

"CONSULTATION AND COOPERATION OF FEDERAL AGENCIES

"SEC. 8. The Nuclear Regulatory Commission, the Secretary of Energy, the Secretary of Transportation, and the Administrator of the Environmental Protection Agency shall consult and cooperate with compact commissions and States in carrying out the provisions of this Act.

"PERIODIC REPORT OF SECRETARY

"SEC. 9. (a) IN GENERAL.—The Secretary shall, not later than the expiration of each 5-year period following the date of the enactment of the Low-Level Radioactive Policy

Amendments Act of 1985, prepare and submit to the Congress a comprehensive report regarding the operation of the national system for the management and disposal of low-level radioactive waste. Such report shall include an evaluation of the use by Federal agencies of each low-level radioactive waste disposal facility established under a compact or by a State, and an estimate of the anticipated use of each facility by all generators of low-level radioactive waste.

"(b) CONSULTATION REQUIREMENTS.—Before preparing the report required in subsection (a), the Secretary shall consult with each compact commission, the chief executive officer of each State, the operators of low-level radioactive waste disposal facilities licensed by the Nuclear Regulatory Commission or an agreement State, the principal generators of low-level radioactive waste, and the transporters of low-level radioactive waste.

"RESPONSIBILITIES OF THE COMMISSION AND AGREEMENT STATES

"SEC. 10. In order to ensure the timely development of new disposal facilities, the Nuclear Regulatory Commission or, as appropriate, Agreement State shall consider an application for a disposal facility license in accordance with the laws applicable to such application except that:

"(1) the Commission or Agreement State shall issue a final decision approving or disapproving the issuance of the license no later than 18 months after submission of the application; and

"(2) construction of the disposal facility may commence prior to issuance of the license.

"ALTERNATIVE DISPOSAL METHODS

"SEC. 11. The Nuclear Regulatory Commission shall within 12 months of the date of the enactment of this Act, by rule, promulgate criteria for the licensing of low-level radioactive waste disposal facilities that use disposal methods other than shallow land burial.

"RECLASSIFICATION OF CERTAIN RADIOACTIVE WASTE

"SEC. 12. Not later than December 31, 1986, the Nuclear Regulatory Commission, pursuant to authority under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) shall, by rule, promulgate minimal standards for the disposal of certain material classified as low-level radioactive waste. Such standards shall identify the low-level radioactive waste that is not required to be disposed of in a licensed low-level radioactive waste disposal facility due to its low radioactive material content and shall prescribe, as necessary, technical requirements and criteria governing the disposal of such waste to protect the public health and safety.".

"EFFECTIVE DATE

"SEC. 13. (a) EFFECTIVE DATE.—Sections 2 through 12 of this Act, as added by the Low-Level Radioactive Waste Policy Amendments Act of 1985, shall take effect on the date on which the Congress consents to the last of the compacts listed in subsection (b) having previously consented to the other five.

"(b) COMPACTS.—The compacts subject to consent as provided in subsection (a) are the—

"(1) Southeast Interstate Low-Level Radioactive Waste Management Compact;

"(2) Northwest Interstate Compact on Low-Level Radioactive Waste Management;

"(3) Rocky Mountain Low-Level Radioactive Waste Compact;

"(4) Central Interstate Low-Level Radioactive Waste Compact;

"(5) Central Midwest Interstate Low-Level Radioactive Waste Compact; and

"(6) Midwest Interstate Compact on Low-Level Radioactive Waste Management.".

STATEMENT OF HON. STROM THURMOND, A U.S. SENATOR FROM THE STATE OF SOUTH CAROLINA, ACCOMPANIED BY CYNTHIA BLACKBURN, STAFF COUNSEL, JUDICIARY COMMITTEE

Senator THURMOND. Thank you very much, Mr. Chairman, for your kind words.

Mr. Chairman, I would like to thank you for inviting me to appear at this joint hearing of the Energy Research and Development Subcommittee of the Energy and Natural Resources Committee and the Nuclear Regulation Subcommittee of the Environment and Public Works Committee. Your prompt attention to this matter indicates that both committees realize the gravity of the low-level radioactive waste situation and are willing to work toward a suitable resolution.

Under the Low-Level Radioactive Waste Policy Act of 1980, which I was pleased to work on along with several members of these committees, States were encouraged to enter into regional compacts to handle low-level waste. As an incentive for entering such compacts, the 1980 act authorized any such organized region whose compact had been approved by Congress to exlude out-of-region waste beginning January 1, 1986.

Six regional compacts, involving 33 States, have been submitted to the Senate this session and have been approved by the Judiciary Committee. These pending items have not received congressional consent because nonsited regions will not have their own disposal sites in operation by January 1, 1986.

Therefore, the full burden of nationwide disposal continues to fall on the three current sites located in South Carolina, Nevada, and Washington. The Governors of these three States have indicated that they will close these sites on January 1, 1986, if Congress has not satisfactorily addressed the disposal problem.

In order to gain consent for these compacts and avoid a nationwide crisis caused by the closing of the existing sites, I introduced S. 1578, the Low-Level Radioactive Waste Amendments Act of 1985, and amendment No. 583 to S. 1517 introduced by Senator McClure. This legislation is supported by the Governors of South Carolina, Washington, and Nevada, as well as a bipartisan coalition of Members of Congress.

This legislation provides a 7-year transition period during which nonsited regions will have continued access to the existing disposal sites while they develop their own disposal sites.

There are several important features of this legislation:

The three existing disposal sites—South Carolina, Washington, and Nevada—will continue to receive waste through December 31, 1992, 7 years longer. And I might say this is 7 years longer than was provided in the law of 1980.

Volume caps will be placed on the amount of waste each of the three sites is required to take.

Utility generators will be allocated a specific amount of disposal capacity to be used at their discretion.

Nonsited compact regions and States will be required to meet specific milestones toward developing their own disposal sites. If the milestones are not met, access to the disposal sites will be cut off.

An escalating surcharge will be placed on all waste from nonsited regions and States.

Mr. Chairman, when I introduced this legislation that I just outlined, I stated that the transition legislation and the compacts would be treated as a package on the Senate floor. Majority Leader Dole also assured that the transition legislation and the compacts will be treated as a package. Accordingly, the six compacts were reported out of the Judiciary Committee, of which I am chairman, on September 19, 1985, and will not be considered until they are accompanied by suitable transition language.

Mr. Chairman, I believe this transition legislation strikes a reasonable balance between the need for disposal of low-level waste and fairness to those States which have done more than their share in handling all of the Nation's low-level waste.

I strongly urge each one of you to resist the temptation to make changes supported by special interest groups that would upset the balance reached by this legislation.

Thank you for giving me this opportunity to address this very important issue. I look forward to working with the members of both committees to gain approval for the compacts and the transition language in the remaining days of this session of Congress.

Now, Mr. Chairman, I just want to say that these three States have borne the burden for years. The Governors say they can't bear it any longer. It's really not fair for three States to have to take all this low-level waste for the whole Nation, and that's the reason the law was passed in 1980, providing that the States would enter into compacts or take care of the low-level waste themselves.

I think Texas probably, I understand, will take care of its own waste. In my area we have the States of the Southeast that have joined together in the compact. These other States have joined, as I mentioned, and 33 States have now prepared compacts and entered into them.

The other States must act and they must do it quickly. If not, they are going to be caught. And I want to caution the Members of Congress and caution the Governors of all these States and other people interested, that it's essential that we take action at this session of Congress. It just must not be put off because if these three States close those States to out-of-State low-level waste, what are they going to do?

You've got low-level waste in hospitals and you've got it from many other places that must be cared for. Now, I want to commend those three States for being as reasonable about this as they have been. The law said they would take care of them after January 1, 1986. They haven't done it. These three Governors have agreed to go 7 years longer, but if the Congress acts this year and sets up the arrangements as I've outlined in this legislation.

I hope this will be acted upon promptly and we will deeply appreciate the cooperation of both subcommittees, of the Energy Committee and the Public Works Committee, in accomplishing this goal.

Senator SIMPSON. Thank you very much, Senator Thurmond. You do cite very clearly the possible extraordinary results if we do not resolve this issue. Indeed the Committee on Energy and Natural Resources, their Subcommittee on Energy Research and Development, and this Subcommittee on Nuclear Regulation of the Environnent and Public Works Committee, heed your remarks. You stated it very crisply and eloquently, and we thank you very much for that, Senator Thurmond.

Senator THURMOND. Thank you, Mr. Chairman.

Senator SIMPSON. Is Congressman Butler Derrick here? I was told that he was on his way. I hate to pass up the request of any colleague, but because of the previous delay, I think we'll just go ahead with the first panel, and then when Congressman Derrick arrives, I'll interrupt the panel to hear his remarks.

On the first panel we'll have William J. Dircks, Executive Director of Operations of the Nuclear Regulatory Commission, accompanied by John Davis, Director of the Office of Nuclear Material Safety and Safeguards; Sheldon Meyers, Acting Director of the Office of Radiation Programs, U.S. Environmental Protection Agency, accompanied by Michael Cook, Deputy Director of the Office of Solid Waste; and James W. Vaughan, Jr., Acting Assistant Secretary for Nuclear Energy of the U.S. Department of Energy.

Before we proceed, I would recognize two very fine members of the Committee on Environment and Public Works, and especially our fine chairman, Senator Bob Stafford of Vermont, and Senator Pete Domenici of New Mexico.

Chairman Stafford, do you have anything you wish to share, sir?

STATEMENT OF HON. ROBERT T. STAFFORD, A U.S. SENATOR FROM THE STATE OF VERMONT

Senator STAFFORD. Thank you very much, Mr. Chairman. I do have a brief statement.

I am pleased to be at this joint hearing. I would like to express my appreciation to Senator Simpson, the distinguished chairman of the Nuclear Regulation Subcommittee, to Senator Domenici, the distinguished chairman of the Subcommittee on Energy Research and Development of the Energy Committee, and to Senator McClure, the distinguished chairman of the Energy Committee. Their leadership on this pressing issue has enabled us to have this joint hearing. I look forward to continuing to work together on this important matter.

It is clear that the timely and equitable disposal of the Nation's low-level radioactive waste is an urgent and national issue. The deadline in the current law is January 1, 1986. A solution to the present problem should be found as quickly as possible.

The bill that was introduced by my distinguished colleague, Senator Thurmond, has been given priority on the Environment Committee's calendar.

It is my intent that the committee proceed both expeditiously and carefully in addressing this issue.

The testimony being given today should provide the committee with valuable information for its deliberations. I would like to thank all witnesses who have taken the time to testify here today.

Senator SIMPSON. Senator Domenici.

STATEMENT OF HON. PETE V. DOMENICI, A U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator DOMENICI. Thank you very much, Mr. Chairman. First of all, I want to thank you for agreeing to cochair this and have a joint meeting with the Energy Committee where there is joint jurisdiction for this subject matter.

I have a very brief statement.

On January 1, 1986, most utilities, as well as medical research and industrial concerns may confront the reality of having nowhere to dispose of low-level waste. In passing this Low-Level Waste Policy Act of 1980, Congress declared that the responsibility for low-level nuclear waste rests with the individual States, and it authorized and encouraged States to enter into regional compacts to provide for the disposal of waste generated within the regions.

It specified that beginning in 1986, congressionally approved regional compacts may prohibit importation of low-level wastes from other States outside the compact region.

To date, not a single new site has been developed, even though several States have launched extensive efforts in establishing waste management programs and potential sites. It seems that the not in my backyard syndrome has prevailed and has kept progress at a crawl.

I applaud Senators McClure and Thurmond in introducing S. 1517 and S. 1578 respectively. I sincerely hope that we can work out some solution before the end of the year so that the operation of the industries would not be disrupted and the three States with active sites—Nevada, South Carolina, and Washington—would not be asked to bear the burden of disposal of low-level waste indefinitely.

If we can't do that, then the results out there in the United States are going to be rather dramatic. I hope we don't have to wait for that event to come to our senses.

Thank you, Senator. I'm ready to proceed.

Senator SIMPSON. I will insert a statement from Senator McClure at this point in the record.

[The prepared statement of Senator McClure follows:]

OPENING STATEMENT

By Senator James A. McClure

Hearing on S. 1517 and S. 1578
Low-Level Waste Bills

In the fall of 1979, two of the nation's three operating low-level waste disposal facilities were temporarily closed down, heightening the interest of Congress in providing a more equitable and stable solution to the nation's low-level waste disposal problem. This lead to passage of the Low-Level Radioactive Waste Management Act of 1980.

The Act clearly established the states' responsibilities for providing low-level waste disposal capacity, and encouraged the states to do so via the formation of regional compacts. According to the provisions of the Act, Congressional ratification of these compacts would enable regions to deny outside access to their facilities as of January 1, 1986.

That date is less than three months away, yet formation of these regional compacts is far from complete, and, what's worse, no new regional low-level waste disposal facilities are even close to becoming a reality.

It seems that the 96th Congress was rather over-optimistic in its timeframe. It also appears that states have been exceedingly sluggish in coming to terms with their responsibilities. Meanwhile, the three sited states--South Carolina, Washington and Nevada--are still faced with the entire burden of low-level waste disposal, with no indications, let alone assurances, that this burden will be relieved in the foreseeable future.

THESE THREE STATES ARE GROWING WEARY OF THEIR RESPONSIBILITIES. IT IS LIKELY THAT, IF THE PRESENT IMPASSE IS NOT RESOLVED, THIS COUNTRY MAY BE FACED WITH A CRISIS VERY SIMILAR TO--OR PERHAPS WORSE THAN--THE ONE IT FACED IN 1979.

OUR COUNTRY CAN NOT AFFORD SUCH A CRISIS. THE PEOPLE WHOSE LIVES AND LIFESTYLES RELY ON THE SERVICES PROVIDED BY UTILITIES, HOSPITALS, UNIVERSITIES, RESEARCH CENTERS, AND MANY OTHER INDUSTRIES THAT GENERATE QUANTITIES OF LOW-LEVEL WASTE, SHOULD NOT HAVE TO DEAL WITH SUCH A DISRUPTION.

I HAVE FAITH THAT THIS CONGRESS CAN DEFUSE THIS TIMEBOMB. WE HAVE BEFORE US TODAY TWO BILLS--S. 1517 AND S. 1578--THAT OFFER A FRAMEWORK WITHIN WHICH TO RESOLVE THE PRESENT DIFFICULTIES. THE PROPOSALS REPRESENT A YEAR'S WORTH OF EFFORT ON THE PART OF THE WASTE GENERATORS, THE GOVERNORS OF THE SITED STATES, THE NON-SITED COMPACT REGIONS AND STATES, AND THE PUBLIC AT LARGE, TO CRAFT A REALISTIC AND WORKABLE SOLUTION TO THE CURRENT DILEMMA.

I LOOK FORWARD TO THE TESTIMONY WE WILL BE RECEIVING TODAY. WITH YOUR INPUT AND OUR DILIGENCE, IT IS MY HOPE THAT THIS CONGRESS WILL NEVER AGAIN HAVE TO FACE THIS ISSUE, AND THAT BY THE YEAR 1993, WE WILL HAVE A LOW-LEVEL WASTE DISPOSAL NETWORK IN PLACE THAT IS BALANCED AND EQUITABLE FOR ALL CONCERNED PARTIES.

Senator SIMPSON. Mr. Dircks, as we hear your testimony, we would appreciate it if you would keep within the time constraints. Go ahead, please.

STATEMENT OF WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS, NUCLEAR REGULATORY COMMISSION, ACCOMPANIED BY JOHN DAVIS, DIRECTOR, OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS

Mr. DIRCKS. Thank you, Mr. Chairman. In keeping with your time constraints, I'd like to submit our detailed testimony and analysis of the bills for the record, and I'll just summarize our statement.

Senator SIMPSON. Without objection so ordered.

Mr. DIRCKS. I'm accompanied by John Davis, who is the Director of the Office of Nuclear Material Safety and Safeguards, and he has the responsibility within the Commission for this program.

We are appearing today to discuss the amendments to the Low-Level Waste Policy Act, specifically S. 1517 and S. 1578. The approach adopted in both bills is similar to that found in H.R. 1083, as reported by the House Committee on Interior and Insular Affairs.

The Commission supports congressional efforts to clarify the implementation of the Low-Level Waste Policy Act and the compacts. We have, however, identified several concerns and I'd like to just briefly summarize those issues.

As I mentioned, a more detailed discussion of these issues is provided in our prepared testimony and our detailed analysis of H.R. 1083.

Senator SIMPSON. Mr. Dircks, I hate to do this, but Congressman Derrick has arrived, and if we could have his remarks at this time and then we will go right back to the panel. I appreciate your accommodation of that.

Congressman, nice to have you here. Please proceed.

STATEMENT OF HON. BUTLER DERRICK, A U.S. REPRESENTATIVE FROM THE STATE OF SOUTH CAROLINA

Mr. DERRICK. Thank you very much for accommodating me. I have a committee meeting. Senator, it is not good to see you again.

Senator DOMENICI. I know that. How's reconciliation going?

Mr. DERRICK. Well——

Senator DOMENICI. You'd rather be here, I suppose.

Mr. DERRICK. Right. It's going. That's why I have to get back over there.

Mr. Chairman, thank you for affording me this opportunity to appear before you and your colleagues on the Subcommittees on Nuclear Regulation and Energy Research and Development.

It's been almost 5 years since I've been before this chamber on this matter. In December 1980, I was engaged in a lobbying effort on the Senate floor to persuade certain of our colleagues to remove holds they had placed on comprehensive nuclear waste disposal legislation then pending before the Senate.

The holds were removed on the low-level waste disposal portions of the bill and the provisions were adopted by the Congress in the closing days of the 95th Congress. The statute of the Low-Level Waste Policy Act of 1980 was the first attempt we, as a nation, took to address a problem that had literally been accumulating for over three decades.

The policy embodied in the Low-Level Waste Policy Act of 1980 remains as sound today as it did then. That act was a unique experiment in federalism, long before the idea was fashionable. States wanted the responsibility to handle and dispose of low-level radioactive waste. The Congress agreed, and established a barebone statute to accomplish this end.

States were urged to enter into regional interstate compacts to share a common dumpsite and prevent the proliferation of such disposal sites. Once these compacts were formed, Congress would grant consent to the restraint on interstate commerce beginning January 1 1986. Compacts would be granted so-called exlusionary authority, power to enforce the compact border and exclude from disposal all waste generated outside the compact region.

We have come a long way since 1980. To date, over 40 States have entered into these interstate agreements and seven compacts for the disposal of low-level radioactive waste are presently pending before Congress.

We still have a considerable way to go on this issue. Unfortunately, for several years, some States choose to adopt a strategy of lobbying Congress for a setback of the 1986 date, rather than accomplish the admittedly tough political task of joining compacts, picking host States, and selecting and developing disposal sites. Critical time was lost.

I am pleased to be before you today, however, in support of a legislative proposal that would get us out of the bind. Considerable momentum has gathered behind the so-called transition proposal. In the House, the Committee on Interior and Insular Affairs has reported H.R. 1083, the Low-Level Radioactive Waste Policy Amendments Act of 1985. This legislation has also been reported by a subcommittee of the second House committee on jurisdiction, the Committee on Energy and Commerce.

I expect the measure to be considered by the full Energy and Commerce Committee by the end of this month.

Similar legislation has been introduced in the chamber by Senators Thurmond and McClure. I urge your committees to proceed to markup on these measures as expeditiously as possible.

Some will tell you that the date by which exclusionary authority would be conferred upon the compacts under the 1980 act was symbolic and not intended to be a true drop dead date. Indeed, this was the precise lobbying strategy of those who sought to get the date set back.

I am here to tell you, however, that the three States which currently serve as low-level radioactive waste disposals for the entire Nation view January 1, 1986, as the date by which this disposal burden would be more equitably shared and a date by which they could gain some measure of control over their own destiny on this subject.

The Governors of the three host States have made clear their intent to ensure that Congress honors the commitment given them in the 1980 act. Quite simply, these Governors have pledged to take strong parallel action to limit or cease access to the disposal sites beginning the first of next year if Congress fails to resolve the situation by that time.

The solution to this potential crisis is before you. The transition proposal which is the subject of these hearings embodied in S. 1578 and S. 1517 will get us from the present situation with only the same three States in operation, to a point 7 years down the road where all compacts will have their own disposal capacity.

This is a balanced and fair proposal. Quite frankly, I can tell you that there is not a single party with an interest in this legislation who cannot point to a provision in this bill they don't like. They will also tell you, however, that they can live with the package as a whole. This, I believe, is the strength of the proposal; it is a consensus compromise on a number of highly contentious issues. Everyone must lose a little. Everyone must suffer some pain if an equitable solution is to be reached.

As you know, this proposal has its genesis and efforts initiated early this year to bring State representatives together to fashion a consensus package. I would also like to point out that this effort was initiated by the three host States, a clear demonstration of the good faith with which these States have sought to avoid a crisis at the first of next year.

The individual elements of the plan are linked and coordinated in a careful way to enable a consensus to form around the package as a whole in return for consent to compact, subject to agreements to provide continued access to existing disposal sites after January 1, 1981.

The plan calls for a comprehensive system of waste volume caps and generator limitations to meet that cap; intermediate milestones and an absolute drop dead date in order to drive the process of siting and constructing new disposal capacity in the United States; surcharges for access to existing disposal capacity to compensate the three host States for providing a stopgap solution and to send a clear message that we are not operating business as usual; and a tightly drawn exemption from the disposal limitations in the bill in order to ensure public health and safety.

The final drop dead date at the end of 1992 is an absolutely essential component of this proposal. The sited States are providing a 7-year stopgap solution to this problem and they must be assured of an absolute outside boundary on this liability.

The message is clear: Nonsited States and regions have had 7 years to solve their own problem. If they choose disposal technology that requires longer to construct and license, then they must make provision for interim storage on their own. If this plan is to have any meaning and if it is to be supported by the host States, the 1992 date must be preserved.

The milestones are also critical to the success of the plan. They were the missing element in the 1980 act, and in all honesty the provisions in the bill before you are perhaps not strong enough. Any weakening of these provisions will defeat the primary purpose of the legislation—to induce the construction of low-level radioactive waste disposal capacity.

On the issue of surcharges, Mr. Chairman, the House Subcommittee on Energy Conservation and Power which recently marked up this legislation incorporated a surcharge rebate scheme to send a portion of the surcharges back to the disposing States when milestones are met.

While we can accept a rebate of 25 percent of these surcharges, we also expect that offsetting provisions will be incorporated, such as tighter milestones to return the package to the balance that we struck when it was first put together.

Finally, Mr. Chairman, the provisions which allow for an emergency exemption from the disposal limits in the legislation is an area where great mischief can take place. The entire disposal will be defeated if the emergency exemption provisions are expanded. In this regard, we strongly favor the version of this provision which emerged from the House Interior Committee markup. The Interior provisions give the Nuclear Regulatory Commission 45 days to act on a petition for emergency access. In order to grant such access, the NRC must find that there is a threat to the public health and safety, and such threat cannot be mitigated by storage, obtaining a voluntary access agreement, purchasing interim disposal capacity, or ceasing to generate low-level waste.

Mr. Chairman, as you and your colleagues on this committee seek to review this proposal, I believe it is appropriate to understand how we have sought to balance the equities in the plan. In return for access, sited regions are being given concrete assurances that they won't have to take more waste than they are taking today, and a comprehensive regime is implemented, sufficient to compel construction of a new disposal capacity to ensure that the three host States can be out of the business of being the Nation's dumping ground by a date certain.

The allocation system we have devised gives credit to those utilities that have taken care of their own problem and imposes the heaviest burden on those which have simply proceeded under a business-as-usual assumption.

The milestones have been mandated only to the point where States can still affect the process, only to the point at which they submit a license to the NRC. We impose no other requirement on them.

The grace period offers States and regions a 3-year period to receive license approval and construct a disposal site.

Finally, Mr. Chairman, the public interest is safeguarded by providing an orderly transition to a regional disposal network as originally envisioned in the 1980 act of probably fewer than 15 low-level radioactive waste disposal sites.

Mr. Chairman, I commend this proposal to the committee. While we have made very significant progress on this issue, we have a long way to go in a very short time. We are probably down to a month and a half remaining in the session of Congress.

It is imperative that we move forward on this legislation. I look forward to working with you on this matter, and again I appreciate your consideration in allowing me to appear before you, and my apologies to the present panel for jumping in front of them.

Senator SIMPSON. Thank you very much. We appreciate having your remarks, and again you bring the singular perspective of one whose State is most affected, and we appreciate that. Thank you.

We have the chairman of the Energy and Natural Resources Committee, Jim McClure, here; and Senator Steve Symms. I want to recognize Senator McClure if he should want to comment, and I want to thank, while they are together, Senator McClure and Senator Stafford. Without their accord and without their willingness to proceed jointly on these issues, they would have been stalled, just like they were for years around this place. High-level waste, low-level waste, all of it just lays there in the bottom of the vat while we have ego struggles and turf fights. Bob Stafford and Jim McClure have resolved it, proved it with high-level waste, and proven it again this way, and I appreciate what they both do.

Mr. DERRICK. Senator, could I just——

Senator SIMPSON. Yes, indeed. Excuse me.

Mr. DERRICK. I would not have a low-level waste bill had it not been for Senator McClure's work over in the Senate in 1980, and there's no question about that.

Senator MCCLURE. Thank you, Congressman. But I also want to thank Senator Simpson for those words, and I did want to note the fact that this a really—not really precedent-setting, but we hope it is at least a continuation of a very constructive effort, an effort by two committees to move jointly, rather than moving separately on separate tracks and timetables. And I think it promises well for a solution to the problem.

I would ask unanimous consent that my opening statement be inserted at the appropriate place in the beginning of these proceedings.

Senator SIMPSON. Without objection, so ordered.

Senator Symms, did you have any comment you wish to make?

Senator SYMMS. No, Mr. Chairman. I am delighted we are going forward with this. I do think it is important.

Senator SIMPSON. Thank you again, Congressman Derrick. I appreciate your being here.

All right, now go right ahead and pick up there where you were, Bill, if you would please.

STATEMENT OF WILLIAM J. DIRCKS—Resumed

Mr. DIRCKS. Where I left off, Mr. Chairman, I think we made the point the Commission supports the pending legislation, but we did have some areas of concern. I would just mention, very briefly, about five of those issues.

The first deals with the pending State compacts authorized under the Low-Level Waste Policy Act of 1982. The NRC has previously testified before the Senate Committee on the Judiciary in the 97th, 98th, and 99th Congresses on these pending compacts. The Commisson believes that all compacts should be consistent with the Federal scheme for regulation of low-level radioactive waste, including a nationally accepted definition of low-level radioactive waste and the preservation of existing NRC, Department of Transportation, and agreement State health, safety, and environmental regulatory authority in these areas of packaging, transportation, and waste disposal.

Clarifying statutory language would serve to emphasize the intent of Congress to preserve Federal authority and would help ensure uniform treatment by the courts.

The second issue deals with the so-called orphan waste issue. The NRC considers it important that all radioactive wastes have a State or a Federal home for disposal. For any given waste, there should be no question whether the responsibility to provide disposal rests with the State or the Federal Government.

There should also be no question that both the Federal Government and the States are to accept these wastes by a given date. The proposed legislation would direct the Secretary of Energy to provide a report to Congress which would identify radioactive wastes for which neither the Federal Government nor the States have responsibility under existing Federal law, as well as identify Federal and non-Federal options for the disposals of such radioactive waste.

The NRC strongly opposes this approach. We believe the legislation pending before Congress should provide a home for all radioactive waste. Otherwise, the current uncertainty regarding the planning for disposal sites and the uncertainty cast upon the generators of such waste would continue.

In addition, Mr. Chairman, the Congress will be returning to this issue in another year if it doesn't solve the problem this time around.

The Commission's third issue is that the proposed legislation does not comprehensively address the relationship between the Low-Level Waste Policy Act and the Resource Conservation and Recovery Act [RCRA]. The Commission believes that the legislation should clarify specifically the delegation of authority of both EPA and NRC to the States for implementing the RCRA permits for management of mixed wastes.

As you know, mixed wastes are those wastes that contain both radioactive material regulated by NRC and its agreement States, as well as other hazardous wastes regulated by EPA or the States. Without such clarification, the mixed waste issue would still result in uncertainty the development of new disposal sites.

Our fourth issue deals with the directions contained in the proposed legislation for the NRC to address three matters through rulemaking, address two matters potentially through rulemaking, concur in two EPA rules, and establish procedures for processing disposal facility license applications.

Most of these activities would need to be completed within a year of enactment of the legislation. This represents a large workload to be handled by the NRC on an expedited basis. The NRC is concerned that it might not be able to promulgate rules in the timeframe contemplated by Congress. This could hinder State efforts to meet the milestones set forth in the legislation.

To meet the various deadlines contained in the proposed legislation, the NRC should be given the maximum regulatory flexibility to select the most appropriate procedures for providing the guidance, taking into account the need for rigorous technical reviews, public participation, and the need for timely action.

The fifth issue of concern relates to the State certification process. The Commission supports the provision that States missing the

1990 milestone for submitting an application to construct a disposal facility are to provide written certification that the State will manage the State's waste after 1992. The bill now provides that the State certification should be made to the NRC. The bill does not provide a mechanism to assure that the State will meet its obligations.

The NRC believes that State certification should be made to the sited States and to the generators and owners of the waste, rather than to the NRC because they are the parties most directly affected by the State's failure to meet the milestone.

These State certifications should be backed by contracts or other enforceable instruments such that the generators and owners would be in a position to seek legal remedy from the certifying State if the post-1992 commitments are not met.

Before closing, Mr. Chairman, I wish to emphasize that there are other areas of concern that the Commission has identified. These are contained in the material that we have submitted for the record. The analysis reflects the Commission's general support for the legislative approach set forth in the bills, but contains recommendations on how the legislation could be improved.

This concludes my remarks, Mr. Chairman. Thank you.

[The prepared statement of Mr. Dircks follows:]

TESTIMONY OF
UNITED STATES NUCLEAR REGULATORY COMMISSION
CONCERNING S.1517, S.1578, H.R. 1083
AMENDMENTS TO THE LOW-LEVEL RADIOACTIVE WASTE POLICY ACT

GIVEN BY: WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS

BEFORE THE

SENATE SUBCOMMITTEE ON ENERGY AND RESEARCH AND DEVELOPMENT

COMMITTEE ON ENERGY AND NATURAL RESOURCES

AND THE

SENATE SUBCOMMITTEE ON NUCLEAR ENERGY

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

OCTOBER 8, 1985

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEES:

I AM WILLIAM J. DIRCKS, THE NUCLEAR REGULATORY COMMISSION'S EXECUTIVE DIRECTOR FOR OPERATIONS.

I AM APPEARING BEFORE YOU TODAY TO DISCUSS AMENDMENTS TO THE LOW-LEVEL RADIOACTIVE WASTE POLICY ACT OF 1980 -- SPECIFICALLY S.1517 AND S.1518. THE APPROACH ADOPTED IN BOTH BILLS IS SIMILAR TO THAT FOUND IN H.R. 1083 AS REPORTED BY THE HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS.

THE U.S. NUCLEAR REGULATORY COMMISSION CONSIDERS IT IMPORTANT FROM A HEALTH, SAFETY, AND ENVIRONMENTAL REGULATORY PERSPECTIVE THAT SAFE LOW-LEVEL WASTE DISPOSAL FACILITIES ARE AVAILABLE TO THE GENERATORS OF LOW-LEVEL WASTE. IN LIGHT OF THE UNWILLINGNESS OF THE THREE STATES WITH OPERATING DISPOSAL SITES TO CONTINUE TO ACCEPT THE COUNTRY'S LOW-LEVEL RADIOACTIVE WASTE INDEFINITELY, THE COMMISSION SUPPORTS CONGRESSIONAL EFFORTS TO CLARIFY THE IMPLEMENTATION OF THE LOW-LEVEL RADIOACTIVE WASTE POLICY ACT AND THE COMPACTS.

THE NRC HAS PREVIOUSLY TESTIFIED BEFORE THE SENATE COMMITTEE ON THE JUDICIARY IN THE 97TH, 98TH AND THE 99TH CONGRESS ON PENDING COMPACTS. THE COMMISSION BELIEVES THAT ALL COMPACTS SHOULD BE

CONSISTENT WITH THE FEDERAL SCHEME FOR REGULATION OF LOW-LEVEL RADIOACTIVE WASTE. IN THIS REGARD, IT IS PARTICULARLY IMPORTANT TO PRESERVE EXISTING NRC, DEPARTMENT OF TRANSPORTATION AND AGREEMENT STATE HEALTH, SAFETY AND ENVIRONMENTAL REGULATORY AUTHORITY IN THE AREAS OF PACKAGING, TRANSPORTATION, AND WASTE DISPOSAL.

A NUMBER OF STATE OFFICIALS HAVE TESTIFIED THAT IT IS NOT THEIR INTENTION TO DUPLICATE, CHANGE OR INTERFERE WITH CURRENT FEDERAL REGULATION. HOWEVER, THE COMPACTS THEMSELVES ARE UNCLEAR IN THIS REGARD. WE RAISE THIS ISSUE BECAUSE OF THE INTERLOCKING DEFINITIONS IN THE COMPACTS AND FUNCTIONS ASSIGNED TO COMPACT COMMISSIONS WHICH APPEAR TO GIVE THEM ASPECTS OF REGIONAL HEALTH AND SAFETY REGULATORY AUTHORITY, WITH POSSIBLE PREEMPTION OF EXISTING FEDERAL REGULATORY AUTHORITY. THE COMMISSION SUPPORTS CLARIFYING STATUTORY LANGUAGE IN ANY LEGISLATION AMENDING THE LOW-LEVEL RADIOACTIVE WASTE POLICY ACT AND IN MODIFICATIONS TO SOME OF THE PROVISIONS OF THE VARIOUS COMPACTS. CLARIFYING STATUTORY LANGUAGE WOULD SERVE TO EMPHASIZE THE INTENT OF CONGRESS TO PRESERVE FEDERAL AUTHORITY AND WOULD HELP ENSURE UNIFORM TREATMENT BY THE COURTS.

THE COMMISSION HAS ALSO TESTIFIED THAT IT BELIEVES THAT THERE SHOULD BE A NATIONALLY ACCEPTED DEFINITION OF LOW-LEVEL RADIOACTIVE WASTE THAT IS IDENTICAL FOR ALL COMPACTS AND STATES.

SIMILARLY WE URGE CLARIFYING STATUTORY LANGUAGE IN ANY LEGISLATION AMENDING THE LOW-LEVEL RADIOACTIVE WASTE POLICY ACT.

IN MY TESTIMONY TODAY, I WOULD LIKE TO FOCUS ON FOUR AREAS OF PARTICULAR CONCERN TO THE COMMISSION. THE FIRST IS THE SO-CALLED "ORPHAN WASTE" ISSUE.

1. A HOME FOR ALL RADIOACTIVE WASTE

THE NRC CONSIDERS IT IMPORTANT FROM A HEALTH, SAFETY, AND ENVIRONMENTAL REGULATORY PERSPECTIVE THAT ALL RADIOACTIVE WASTES HAVE A STATE OR FEDERAL "HOME" FOR DISPOSAL. I AM REFERRING HERE PARTICULARLY TO ALL-NRC REGULATED WASTES, INCLUDING TRANSURANIC-CONTAMINATED WASTES. FOR ANY GIVEN WASTE THERE SHOULD BE NO QUESTION WHETHER THE RESPONSIBILITY TO PROVIDE FOR DISPOSAL RESTS WITH THE STATES (INDIVIDUALLY OR THROUGH REGIONAL COMPACTS), OR THE FEDERAL GOVERNMENT. THERE SHOULD ALSO BE NO QUESTION THAT BOTH THE FEDERAL GOVERNMENT AND THE STATES ARE TO ACCEPT THESE WASTES BY A GIVEN DATE.

UNDER CURRENT NRC REGULATIONS, LOW-LEVEL WASTE THAT MAY BE ROUTINELY DISPOSED OF IN NEAR-SURFACE DISPOSAL FACILITIES IS

DIVIDED INTO THREE CATEGORIES A, B, AND C, WITH CLASS C POSING THE GREATEST HAZARD. THE REGULATIONS ALSO PROVIDE THAT THE NRC MAY, ON A CASE-BY-CASE BASIS, AUTHORIZE DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE WITH RADIOACTIVE CONCENTRATIONS EXCEEDING CLASS C LEVELS.

H.R. 1083 PROVIDES THAT THE STATES WOULD BE ASSIGNED RESPONSIBILITY FOR THE DISPOSAL OF CLASS A, B, AND C WASTES BUT WOULD NOT BE REQUIRED TO DISPOSE OF WASTES EXCEEDING CLASS C CONCENTRATIONS. THE PROPOSED LEGISLATION DOES NOT PROVIDE A "HOME" FOR SUCH WASTES. INSTEAD, IT WOULD DIRECT THE SECRETARY OF ENERGY TO PROVIDE A REPORT TO CONGRESS WHICH WOULD IDENTIFY RADIOACTIVE WASTE FOR WHICH NEITHER THE FEDERAL GOVERNMENT NOR THE STATES HAVE RESPONSIBILITY UNDER EXISTING FEDERAL LAW AS WELL AS IDENTIFY FEDERAL AND NON-FEDERAL OPTIONS FOR DISPOSAL OF SUCH RADIOACTIVE WASTE. THIS REPORT IS TO BE COMPLETED TWELVE MONTHS AFTER H.R. 1083 BECOMES LAW. THEREAFTER, CONGRESS WOULD BE EXPECTED TO ENACT LEGISLATION ASSIGNING A HOME TO THE CLASSES OF WASTE IDENTIFIED.

THE NRC OPPOSES THIS APPROACH. WE BELIEVE THE LEGISLATION PENDING BEFORE CONGRESS SHOULD PROVIDE A HOME FOR ALL RADIOACTIVE WASTE. THE CENTRAL THRUST OF H.R. 1083 IS THAT STATES SHOULD MOVE PROMPTLY TO SITE, DESIGN AND CONSTRUCT LOW-LEVEL WASTE DISPOSAL FACILITIES. WE BELIEVE THAT THERE IS THE POTENTIAL THAT THIS PROCESS WILL BE SLOWED DOWN IF THERE IS UNCERTAINTY AT THE OUTSET

REGARDING WHAT TYPES OF WASTES THE FACILITY MUST BE DESIGNED TO HOLD. WE WOULD ALSO LIKE TO ELIMINATE THE POSSIBILITY THAT A FACILITY UNDER CONSTRUCTION WOULD HAVE TO BE REDESIGNED TO ACCEPT ADDITIONAL TYPES OF WASTES. FINALLY, FROM A HEALTH, SAFETY AND ENVIRONMENTAL PERSPECTIVE WE BELIEVE THAT ALL LOW-LEVEL WASTE GENERATORS SHOULD BE GIVEN AN ASSURANCE NOW THAT A FACILITY WILL BE AVAILABLE TO HANDLE ALL TYPES OF WASTE. IF FACILITIES ARE NOT AVAILABLE FOR CERTAIN CLASSES WASTES, AT SOME POINT IN THE FUTURE THE SUSPENSION OF ALL NRC REGULATED ACTIVITIES WHICH PRODUCE "ORPHAN" WASTE MIGHT BE REQUIRED.

2. REGULATORY UNCERTAINTIES NOT ADDRESSED BY H.R. 1083

OUR SECOND CONCERN IS THAT THE PROPOSED LEGISLATION DOES NOT COMPREHENSIVELY ADDRESS THE RELATIONSHIP BETWEEN THE LOW-LEVEL WASTE POLICY ACT AND THE RESOURCE CONSERVATION AND RECOVERY ACT ("RCRA").

SECTION 15(C) OF H.R. 1083 DIRECTS THE ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY (EPA) TO ENTER INTO AN AGREEMENT WITH THE NRC TO DELEGATE AUTHORITY TO NRC TO ISSUE PERMITS FOR MANAGEMENT OF MIXED WASTES (WASTES THAT CONTAIN RADIOACTIVE MATERIAL REGULATED BY THE NRC AS WELL AS OTHER HAZARDOUS WASTE REGULATED BY EPA). TO ELIMINATE REGULATORY UNCERTAINTY, ADDITIONAL LEGISLATIVE CLARIFICATION IS NEEDED REGARDING THE ROLE OF THE STATES IN REGULATING MIXED-WASTES.

H.R. 1083 DOES NOT CLEARLY SPECIFY THAT THE DELEGATION OF AUTHORITY FOR MIXED WASTES FROM EPA TO NRC WOULD SUPERSEDE ANY PRIOR DELEGATIONS OF AUTHORITY BY EPA TO THE STATES TO ISSUE PERMITS THAT MAY BE APPLICABLE TO NRC-LICENSED DISPOSAL FACILITIES. WITHOUT SUCH LEGISLATIVE CLARIFICATION, SECTION 15 MAY BE CONSTRUED TO PROVIDE THAT THE NRC IS TO BE DELEGATED AUTHORITY IN ADDITION TO SUCH STATES, AND NRC-LICENSED FACILITIES WITHIN THESE STATES WOULD BE SUBJECT TO DUAL NRC-STATE AGENCY REGULATION UNDER RCRA.

A SECOND MATTER THAT WARRANTS CLARIFICATION RELATES TO THE RELATIONSHIP BETWEEN RCRA AND AGREEMENT STATES. H.R. 1083 IS SILENT REGARDING WHETHER THE DELEGATION OF RCRA AUTHORITY FROM EPA TO THE NRC CAN IN TURN BE DELEGATED BY THE NRC TO AGREEMENT STATES AUTHORIZED TO REGULATE LOW-LEVEL WASTE DISPOSAL FACILITIES UNDER SECTION 274B. OF THE ATOMIC ENERGY ACT. WE BELIEVE THAT AGREEMENT STATES SHOULD BE AUTHORIZED TO ISSUE RCRA PERMITS FOR MIXED WASTE DISPOSAL AT AGREEMENT STATE-LICENSED DISPOSAL FACILITIES PURSUANT TO THE EPA-NRC AGREEMENT UNDER SECTION 15. THE STATES WOULD CARRY OUT THIS FUNCTION UNDER NRC OVERSIGHT RATHER THAT UNDER THE OVERSIGHT OF BOTH NRC AND EPA.

3. REGULATORY BURDENS

H.R. 1083 WOULD DIRECT THE NRC TO ADDRESS THREE MATTERS THROUGH RULEMAKING, ADDRESS TWO MATTERS POTENTIALLY THROUGH RULEMAKING, CONCUR IN TWO EPA RULES, AND ESTABLISH PROCEDURES FOR PROCESSING DISPOSAL FACILITY LICENSE APPLICATIONS. MOST OF THESE ACTIVITIES WOULD NEED TO BE COMPLETED WITHIN A YEAR OF ENACTMENT OF THE LEGISLATION. THIS REPRESENTS A LARGE WORKLOAD TO BE HANDLED BY THE NRC ON AN EXPEDITED BASIS. THE NRC IS CONCERNED THAT IT MIGHT NOT BE ABLE TO PROMULGATE RULES IN THE TIMEFRAME CONTEMPLATED BY CONGRESS. THIS COULD HINDER STATE EFFORTS TO MEET THE MILESTONES SET FORTH IN THE LEGISLATION.

SECTION 11 OF H.R. 1083, FOR EXAMPLE, WOULD REQUIRE NRC TO PROMULGATE BY RULE CRITERIA FOR LICENSING DISPOSAL FACILITIES USING ALTERNATIVES TO SHALLOW-LAND BURIAL. THE COMMISSION'S REGULATIONS CURRENTLY PERMIT PERSONS TO APPLY FOR APPROVAL OF ALTERNATIVE DISPOSAL METHODOLOGIES. THE COMMISSION HAS DIRECTED THE NRC STAFF ON A PRIORITY BASIS TO DEVELOP THE NECESSARY TECHNICAL GUIDANCE FOR APPLICANTS WHO MAY WISH TO PURSUE ALTERNATIVE METHODOLOGIES. THE STATUTORY MANDATE TO PROMULGATE RULES COULD BE INTERPRETED TO REQUIRE THE COMMISSION TO ADOPT FURTHER REGULATIONS FOR ALL ALTERNATIVES TO SHALLOW-LAND DISPOSAL. THUS, THE COMMISSION'S CURRENT INITIATIVES ON ALTERNATIVES COULD BE SLOWED DOWN IF FURTHER RULEMAKING IS STATUTORILY REQUIRED. WE

ESTIMATE THAT FURTHER RULEMAKING WOULD REQUIRE A MINIMUM OF TWO YEARS TO COMPLETE FOLLOWING ENACTMENT.

ANOTHER EXAMPLE IS THE REQUIREMENT IN SECTION 6(K) WHICH WOULD DIRECT THE NRC WITHIN SIX MONTHS AFTER ENACTMENT OF THE LEGISLATION TO ESTABLISH CRITERIA AND PROCEDURES FOR GRANTING EMERGENCY ACCESS TO CURRENTLY OPERATING DISPOSAL FACILITIES. IT WOULD BE VIRTUALLY IMPOSSIBLE FOR US TO DEVELOP A PROPOSED RULE, SOLICIT PUBLIC COMMENTS, EVALUATE THE COMMENTS AND PROMULGATE A FINAL RULE WITHIN SIX MONTHS. OUR GOAL FOR COMPLETING THIS PROCESS IS NOW 24 MONTHS. A 6 MONTH DEADLINE FOR PROMULGATING GUIDANCE IS MUCH MORE REASONABLE BECAUSE GUIDANCE COULD BE PROVIDED THROUGH LESS FORMAL MEANS THAN RULEMAKING.

IN SUM, TO MEET THE VARIOUS DEADLINES CONTAINED IN THE PROPOSED LEGISLATION, THE NRC SHOULD BE GIVEN THE MAXIMUM REGULATORY FLEXIBILITY TO SELECT THE MOST APPROPRIATE PROCEDURES FOR PROVIDING THE GUIDANCE, TAKING INTO ACCOUNT THE NEED FOR RIGOROUS TECHNICAL REVIEWS, PUBLIC PARTICIPATION AND THE NEED FOR TIMELY ACTION.

4. MISSED MILESTONE CERTIFICATION

THE COMMISSION SUPPORTS THE PROVISION THAT STATES MISSING THE 1990 MILESTONE FOR SUBMITTING AN APPLICATION TO CONSTRUCT A DISPOSAL FACILITY, ARE TO PROVIDE WRITTEN CERTIFICATION THAT THE STATE WILL MANAGE THE STATE'S WASTE AFTER 1992.

THE BILL NOW PROVIDES THAT THE CERTIFICATION SHOULD BE MADE TO THE NRC. THE BILL DOES NOT PROVIDE A MECHANISM TO ASSURE THAT THE STATE WILL MEET ITS OBLIGATIONS.

THE NRC BELIEVES THE NON-SITED STATE CERTIFICATION SHOULD BE MADE TO THE GEN-ERATORS AND OWNERS OF THE WASTE AS WELL AS TO THE SITED STATES RATHER THAN TO NRC BECAUSE THEY ARE THE PARTIES MOST DIRECTLY AFFECTED BY THE STATE'S FAILURE TO MEET THE MILESTONE. THE LEGISLATION SHOULD ALSO BE MODIFIED TO PROVIDE THE GENERATORS AND OWNERS, AS WELL AS SITED STATES A MECHANISM FOR ENSURING THAT THE NON-SITED STATE FULFILLS ITS COMMITMENTS.

BEFORE CLOSING, I WISH TO EMPHASIZE THAT THERE ARE ALSO OTHER AREAS OF CONCERN TO THE COMMISSION. THEREFORE, WE ARE PROVIDING FOR THE RECORD A DETAILED ANALYSIS OF H.R. 1083 THAT INCLUDES ALL AREAS OF COMMISSION INTEREST EMBODIED IN S. 1517, S. 1578, AND H.R. 1083. THE ANALYSIS REFLECTS THE COMMISSION'S GENERAL SUPPORT FOR THE LEGISLATIVE APPROACH SET FORTH IN THE BILLS, BUT CONTAINS RECOMMENDATIONS ON HOW THE LEGISLATION CAN BE IMPROVED. YOU WILL

NOTE THAT OUR SUGGESTIONS, IF ADOPTED, WOULD ELIMINATE THE CONCERNS THAT WE EXPRESSED TO THE 99TH CONGRESS REGARDING THE SPECIFIC LANGUAGE CONTAINED IN THE VARIOUS REGIONAL COMPACTS THAT ARE NOW BEFORE CONGRESS.

EARLIER IN OUR TESTIMONY WE EXPRESSED CONCERNS ABOUT COMPACT LANGUAGE. WE ARE ALSO PROVIDING A SECOND DOCUMENT FOR THE RECORD WHICH SETS FORTH OUR CONCERNS WITH THE SEVEN COMPACTS NOW BEFORE CONGRESS, AND ADDRESSES WHETHER H.R. 1083 AND S. 1578 WOULD CURE THOSE DEFICIENCIES. IN OUR VIEW, H.R. 1083 RESOLVES OUR CONCERNS WITH THE EXCEPTION OF ISSUE 10 IN OUR DETAILED ANALYSIS OF H.R. 1083.

YOU HAVE ASKED US TO ADDRESS THE ISSUE WHETHER IT IS PREFERABLE TO AMEND THE COMPACTS TO SATISFY THE NRC CONCERNS BY ENACTMENT OF GENERIC LEGISLATION SUCH AS S.1578, OR WHETHER CONGRESS SHOULD MODIFY THE COMPACTS AS PART OF THE LEGISLATION CONSENTING TO EACH SPECIFIC COMPACT. WE BELIEVE THE MOST EFFICIENT WAY FOR THE CHANGES TO BE MADE IS THROUGH GENERIC LEGISLATION PROVIDED: (A) IT IS CLEAR THAT CONGRESSIONAL RATIFICATION OF THE COMPACTS IS CONTINGENT UPON THE TERMS SET FORTH IN THE GENERIC LEGISLATION, AND (B) AS A RESULT OF THE GENERIC LEGISLATION THE STATES WOULD NOT FEEL COMPELLED TO MAKE CHANGES TO THE COMPACTS OTHER THAN THOSE MANDATED BY CONGRESS.

THIS CONCLUDES MY PREPARED REMARKS. THANK YOU.

Senator SIMPSON. Thank you very much, Mr. Dircks.

Let me at this point recognize Wendell Ford, the ranking member of the subcommitte of which we join in this hearing. Nice to have you here this morning, Wendell.

Senator FORD. Thank you, Mr. Chairman.

Senator SIMPSON. Do you have any opening remarks?

Senator FORD. No.

Senator SIMPSON. OK. Then we'll go on with the testimony of Sheldon Meyers, please.

STATEMENT OF SHELDON MEYERS, ACTING DIRECTOR, OFFICE OF RADIATION PROGRAMS, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY MICHAEL COOK, DEPUTY DIRECTOR, OFFICE OF SOLID WASTE

Mr. MEYERS. Mr. Chairman, while my statement is brief, with your permission, I'd like to further summarize it and submit the complete statement for the record?

Senator SIMPSON. Without objection.

Mr. MEYERS. Mr. Chairman, members of the subcommittee, my name is Sheldon Meyers, and since August 1984, I have been Acting Director of the Office of Radiation Programs in the Environmental Protection Agency.

Lee Thomas, our Administrator, appreciates the invitation to appear here today to testify on your pending bills, the Low-Level Waste Policy Act Amendments of 1985, S. 1517, and S. 1578, and has asked that I present the Agency's testimony on this important subject.

I have with me today Mr. Mike Cook, Deputy Director of the Office of Solid Waste.

As you know, Mr. Chairman, the U.S. Environmental Protection Agency does not have a direct role under the Low-Level Waste Policy Act of 1980 in either the negotiation, development or approval of regional interstate compacts. At EPA, we have of course followed the development of the compacts with great interest. We know that the States in several regions have made extensive progress. Elsewhere, much work needs to be done.

The bills would provide to the Department of Energy, continued authority to assist the States, those that are members of compacts and those that are not yet members of compacts, in fulfilling their responsibilities under the Low-Level Waste Policy Act of 1980. Until such time as all States are part of a compact or have accepted sole responsibility for the disposal of low-level radioactive waste within their State, it may well be necessary for this type of technical assistance to be provided so that all States will be able to comply with their responsibilities in the disposal of low-level radioactive waste.

The Senate bills also address DOE reporting requirements and limitations, surcharges, nondiscrimination, and reciprocity of users of the current regional disposal facilities at Barnwell, SC; Hanford, WA; and Beatty, NV. While we support the concept of the interstate compacts and the work required to institutionalize these compacts, we defer to the agencies more directly involved under the statute for specific comments regarding these provisions.

We note that the Senate bills call upon EPA to consult and cooperate with compact commissions and States in carrying out the act's provisions, and we will certainly continue to do that as we have in the past.

We have been working particularly closely with the Conference of Radiation Control Program Directors, a national organization which represents State radiation health professionals in this area.

EPA has a role, but only a limited one, in low-level radioactive waste. EPA has the authority to establish generally applicable environmental standards to protect public health and the general environment from adverse effects from the land disposal of low-level radioactive waste. We published an advance Notice of Proposed Rulemaking, expressing our intention to do so in August 1983.

EPA had originally expected to publish a proposed low-level radioactive waste standard early in 1985, with promulation of our final standard 1 year later in 1986. That schedule, unfortunately, has been delayed by about 1 year. There have been two principal causes for this postponement.

First, in response to a specific request from the States and from the Conference of Radiation Control Program Directors, EPA has expanded the coverage of the low-level waste standard to include waste from naturally-occurring and accelerator-produced radioactive material, otherwise called NARM.

The States were especially concerned about the treatment of NARM waste and what they saw as a problem, because these wastes were not covered by the rules governing the handling of radioactive waste. We chose to include NARM waste within the coverage of our standard in order to avoid this problem.

This will eliminate the guesswork, the diversity of standards, and the broad differences we now find among the States in handling NARM wastes. In some cases, including NARM waste will allow the States to provide needed control where none exists today.

It is important that EPA promulage a final low-level waste standard because the final standard will contain several important elements which will make it especially useful. I have mentioned NARM waste already. The standard, as presently conceived, will also deal with and define criteria for wastes which are below regulatory concern [BRC].

When wastes contain very small concentrations of short-lived radioactivity, there is no reason from a public health point of view, why they cannot be disposed of as we would normal trash. Space and future regional low-level waste disposal facilities will be scarce and relatively expensive.

If we can safely exclude certain classes of material as below regulatory concern, we can save valuable space in these disposal facilities and save time, trouble, and money to everyone involved.

We feel our standard is also important because of its expanded coverage beyond shallow land disposal, the conventional technique now in use. Our proposed standard will evaluate the costs and risks associated with nine other technologies as possible land disposal alternatives to shallow land disposal. These are engineered surface storage; sanitary land fill; improved shallow land disposal; intermediate depth disposal—that is, over 10 meters deep; deep geologic disposal in mine cavities over 100 meters deep; hydrofracturing;

deep-well injection; the engineered mound; and finally, disposal by modular concrete cannisters placed in a trench.

We believe that an examination of these alternatives will provide very useful information to those States and compacts that are seriously considering the use of methods of disposal other than conventional shallow land disposal.

Finally, we have one specific comment to make on the Senate's proposed amendments. The Nuclear Regulatory Commission is charged with promulgating minimal standards for the disposal of low-level waste that is not required to be disposed of in a licensed low-level radioactive waste facility. It is appropriate for the NRC to promulgate regulations for such waste, but standards related to population exposure are within the purview of EPA. In order to avoid confusion, we recommend that this wording change be made.

Mr. Chairman, this concludes my prepared remarks and we will be pleased to answer any questions the committee may have.

[The prepared statement of Mr. Meyers follows:]

STATEMENT OF

SHELDON MEYERS

ACTING DIRECTOR, OFFICE OF RADIATION PROGRAMS

U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE

SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT

COMMITTEE ON ENERGY AND NATURAL RESOURCES

AND SUBCOMMITTEE ON NUCLEAR REGULATION

COMMITTEE ON ENVIRONMENT AND

PUBLIC WORKS

UNITED STATES SENATE

OCTOBER 8, 1985

Mr. Chairman, my name is Sheldon Meyers and since August 1984 I have been Acting Director of the Office of Radiation Programs in the U.S. Environmental Protection Agency. Lee Thomas, Administrator of EPA, appreciates the invitation to appear today to testify on your pending bills, the Low-Level Radioactive Waste Policy Amendments of 1985, S.1517 and S.1578 and has asked that I present the Agency's testimony on this subject.

As you know, Mr. Chairman, the U.S. Environmental Protection Agency does not have a direct role under the Low-Level Radioactive Waste Policy Act of 1980, in either the negotiation, development or approval of regional interstate compacts. At EPA, we have, of course, followed the development of the compacts with great interest. We know that the States in several regions have made extensive progress; elsewhere, much work remains to be done. The bills would provide to the Department of Energy (DOE) continued authority to assist the States (those that are members of compacts and those that are not yet members of compacts) in fulfilling their responsibilities under the Low-Level Radioactive Waste Policy Act of 1980. Until such time as all States are part of a compact or have accepted sole responsibility for the disposal of low-level radioactive waste within their State, it may well be necessary for this type of technical assistance to be provided so that all States will be able to comply with their responsibility in the disposal of low-level radioactive waste.

The Senate bills also address DOE reporting requirements and limitations, surcharges, nondiscrimination and reciprocity of users at the current regional disposal facilities at Barnwell, South Carolina, Hanford, Washington, and Beatty, Nevada. While we support the concept of the interstate compacts and the work required to institutionalize these compacts, we defer to the agencies more directly involved under the statute for specific comments regarding these provisions. We note that the Senate bills call on EPA to consult and cooperate with compact commissions and States in carrying out the Act's provisions and we will certainly continue to do that as we have in the past. We have been working particularly closely with the Conference of Radiation Control Program Directors, a national organization which represents State radiation health professionals in this area.

EPA has a role, but only a limited one, in low level radioactive waste management. EPA has the authority to establish generally applicable environmental standards to protect public health and the general environment from adverse effects from the land disposal of low-level radioactive wastes. We published an Advance Notice of Proposed Rulemaking expressing our intention to do so in August of 1983.

EPA had originally expected to publish a proposed low-level radioactive waste standard early in 1985, with promulgation of our final standard a year later, in 1986. That schedule unfortunately has been delayed by about a year. There have been two principal causes for this postponement.

First, in response to a specific request from the States and from the Conference of Radiation Control Program Directors, EPA has expanded the coverage of the low level waste standard to include wastes from naturally-occurring and accelerator-produced radioactive materials (NARM). The States were especially concerned about the treatment of NARM wastes and what they saw as a problem because these wastes were not covered by the rules governing the handling of radioactive wastes. We chose to include NARM wastes within the coverage of our standard in order to avoid this problem. This will eliminate the guesswork, the diversity of standards and broad differences we now find among the States in handling NARM wastes. In some cases it will allow the States to provide needed control where none exists today.

Also, in connection with its review last year of EPA's proposed standard for radionuclides under the Clean Air Act, EPA's Science Advisory Board (SAB) made several suggestions for improving the format, content and presentation of our risk assessments so that future scientific reviews would be more effective and more useful to the Agency. We fully support those changes and have adopted the necessary formats for SAB's review of the low-level waste standard, which is now in progress.

A special panel of the SAB, the Radiation Advisory Committee, was appointed in February of this year. The initial request made of this group of experts by the Agency was to examine the risk analysis, which is an integral part of the low-level waste standard development. The SAB has been reviewing the scientific basis for the low-level waste standard and we expect their final report will be presented to the Agency this Fall. We believe that this kind of review will greatly enhance the scientific credibility of the standard and any revisions to accommodate recommendations by the SAB will be well worth the delay.

It is important that EPA promulgate a final low-level waste standard, because the final standard will contain several important elements which will make it especially useful. I have mentioned NARM waste already. The standard as presently conceived will also deal with and define criteria for wastes that are "below regulatory concern" (BRC). When wastes contain very small concentrations of short-lived radioactivity, there is no reason from a public health point of view why they cannot be disposed of as we would normal trash. Space in future regional low-level waste disposal facilities will be scarce and relatively expensive. If we can safely exclude certain classes of material as "below regulatory concern," we can save valuable space in the disposal facilities as well as time, trouble and money.

We feel our standard is also important because of its expanded coverage beyond shallow land disposal, the conventional technique now in use. Our proposed standard will evaluate the costs and the risks associated with nine other technologies as possible land-disposal alternatives to shallow land disposal. These are: (1) engineered surface storage; (2) sanitary land fill; (3) improved shallow land disposal; (4) intermediate depth disposal (over 10 meters deep); (5) deep geological disposal in a mined cavity (over 100 meters deep); (6) hydrofracturing; (7) deep-well injection; (8) the engineered mound; and finally, (9) disposal by modular concrete cannisters placed in a trench.

We believe that an examination of these alternatives will provide very useful information to those States and Compacts that are seriously considering the use of methods of disposal other than conventional shallow land disposal.

We have this comment on the Senate-proposed amendments: The Nuclear Regulatory Commission is charged with promulgating "minimal standards" for the disposal of low-level waste that is not required to be disposed of in a licensed low-level radioactive waste disposal facility. It is appropriate for the NRC to promulgate "regulations" for such wastes but "standards" related to population exposure are within the purview of the Environmental Protection Agency. In order to avoid confusion we recommend that this wording change be made.

I have with me today Mr. Mike Cook, Deputy Director of the Office of Solid Waste, to assist in answering your questions.

Mr. Chairman, that concludes my prepared remarks. We would be pleased to answer any questions the Committee may have.

Senator SIMPSON. I thank you very much, Mr. Meyers.

Now Mr. Vaughan, please.

STATEMENT OF JAMES W. VAUGHAN, JR., ACTING ASSISTANT SECRETARY FOR NUCLEAR ENERGY, DEPARTMENT OF ENERGY, ACCOMPANIED BY WILLIAM R. VOIGT, DIRECTOR, OFFICE OF REMEDIAL ACTION AND WASTE TECHNOLOGY

Mr. VAUGHAN. Mr. Chairman, I am pleased to appear today to summarize the Department of Energy's views on the two proposals that would amend the Low-Level Waste Policy Act passed in 1980.

Senator SIMPSON. Could you pull that microphone a little more toward you, Mr. Vaughan? Thank you.

Mr. VAUGHAN. I also have a more complete statement for the record, which I would appreciate——

Senator SIMPSON. It will be entered in the record.

Mr. VAUGHAN. I have with me today Mr. William R. Voigt, Jr., who directs our Office of Remedial Action and Waste Technology. We consider that S. 1517, as amended, and S. 1578 provide a useful framework for the development of solutions to the stalemate that has delayed consent to the proposed compacts for the management of this waste.

The recognition by the Governors and the States with disposal facilities of the need to accommodate this 7-year transition period has provided a spirit of cooperation that should allow for continued progress toward developing new disposal capacity nationwide.

Therefore, we recognize and support this balanced approach being taken by both Senate bills, as well as by House Resolution 1083, to amend the Low-Level Radiation Waste Policy Act.

We also believe that the amendments being considered today can be further clarified and strengthened. There are two potential problems with these bills that deserve further consideration. The first potential problem deals with States' responsibilities during the transition period. We believe that the provisions on limited availability of disposal facilities in section 7 of S. 1517 and in section 5 of S. 1578 could be strengthened to ensure continued progress toward emplacing new disposal capacity by 1993.

As drafted, if a State or compact region doesn't meet their specified milestones, penalties contained in the bills accrue primarily to waste generators within that State or compact region, either by loss of access or by increased fees, or both.

Congress may wish to clarify the specific responsibilities of the States themselves for managing their waste if they don't meet the milestones.

The second potential problem we foresee relates to providing assurances to nonutility, low-level waste generators, such as hospitals and universities, to assure that adequate capacity is available to them at currently operating sites during the transition period.

Section 5(a)(2) of both bills may not go quite far enough to assure that adequate capacity is available to this less organized group, and Congress may wish to strengthen the language of that section to assist nonutility generators.

There are two additional changes that we feel should be incorporated into the final version of an amendment. The first pertains to ownership of Federal waste. We recommend that section 4(b)(2) be revised to accommodate those rare instances where the Department accepts title to low-level radioactive waste not produced by the Federal Government, and my formal statement contains suggested language.

The second pertains to emergency access for national security reasons. The Department has recommended adding specific language that would allow the President or his designee to grant access to any operating disposal facility for low-level waste generated as a result of activities of the Department of Defense, if there is no disposal facility in operation in the State or region of origin and disposal of the waste is required for reasons of national security.

Again, my formal statement contains some suggested language.

I would next like to very briefly comment on the responsibilities that these bills would assign to the Department of Energy as new responsibilities. First, they require that the Secretary develop and submit to Congress, within 12 months, a comprehensive report that would recommend measures to resolve the issues related to the safe disposal of radioactive waste, commonly called "orphan waste," that is not provided for under other Federal law.

We believe we can meet that schedule and we'll be pleased to provide recommendations for this category of waste. It should be noted that implementation of the recommendations in this report would likely require some additional congressional action.

Second, both bills direct the Secretary of Energy to provide technical and financial assistance to compact regions and States for purposes of assisting them in fulfilling their responsibilities under the proposed legislation. The Department opposes providing continued financial assistance, because such additional direct financial assistance to compact regions and States will not contribute significantly to the formation of additional compacts.

The Department's role should continue to be limited to providing technical assistance to these States and regions to the extent made possible by appropriations.

Such technical assistance should continue to be limited to consultation and review of site selection and development planning and licensing procedures.

Third, S. 1517 proposes to have the Secretary of Energy prepare and submit an annual report to the Congress that would summarize the progress of low-level waste disposal siting and licensing activities nationwide. S. 1578 differs in that it requires a review every 5 years.

We support the preparation of an annual report, but only during the 7-year transition period, and suggest that the need for additional reports should be examined in 1992 after the completion of the transition period. It should be noted, however, that the information needed to comply with S. 1517 would require a survey of the entire waste management and disposal industry, including full disclosure of waste generation, treatment, storage, and shipping practices. It will take us some time to develop a comprehensive data base, since much of the information required has not been sought before.

Some of this information may be considered sensitive by waste generators or waste treatment transportation and disposal companies, and therefore the completeness of such a report to the Congress will depend upon the degree of cooperation obtained in a voluntary request for information from the organizations that generate, manage, and dispose of low-level radioactive waste.

To briefly summarize, the Department believes that congressional consideration of the two potential problems we have noted in this statement will lead to a strengthened amendment. In addition, we've made two specific recommendations which we believe would further clarify and strengthen the two Senate bills.

And finally, we see a rather limited role for the Department of Energy to play as States and regions provide the necessary new disposal capacity for low-level waste generated within their borders. We will be pleased to continue providing technical support to the compact regions and States, but we do oppose any provision that would require the Federal Government to provide direct financial assistance.

The Department does favor the passage of legislation this session as well as timely consent to the compacts that have been submitted to the Congress for consideration.

That concludes my statement, and we would be pleased to join with my colleagues in responding to any questions you may have.

[The prepared statement of Mr. Vaughan follows:]

STATEMENT OF
JAMES W. VAUGHAN, JR.
ACTING ASSISTANT SECRETARY FOR NUCLEAR ENERGY
BEFORE THE
SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT
COMMITTEE ON ENERGY AND NATURAL RESOURCES
AND THE
SUBCOMMITTEE ON NUCLEAR REGULATION
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE

OCTOBER 8, 1985

Mr. Chairman, I am pleased to appear this morning to present the Department's views on S. 1517, as modified by Amendment 583, and S. 1578, the "Low-Level Radioactive Waste Policy Act Amendments of 1985." S. 1578 contains the same language as Amendment 583 to S. 1517.

There is a similar bill currently before Congress--H.R. 1083--which would also amend the Low-Level Radioactive Waste Policy Act passed in 1980. H.R. 1083 was reported out of the House Interior and Insular Affairs Committee on July 31, 1985.

INTRODUCTION

Both S. 1517, as modified by Amendment 583, and S. 1578 provide a useful framework for the development of consistent and comprehensive solutions to the stalemate that has delayed congressional consent to proposed interstate compacts for the management of low-level radioactive waste. The recognition by the Governors of the states with disposal facilities of the need to accommodate a 7-year transition period after January 1, 1986 has provided a spirit of cooperation that should allow for continued progress toward developing new disposal capacity nationwide. During this period, states without disposal sites can continue to dispose of their wastes while developing new disposal facilities. The Department will make available technical expertise to the compact regions and States in fulfilling their responsibilities in this area.

We recognize and support the general approach being taken by S. 1517, as modified by Amendment 583, and S. 1578 to amend the Low-Level Radioactive Waste Policy Act, namely to continue the current practice of disposing of civilian and certain Federal agency wastes at commercially operated facilities and minimize changes to the proposed interstate compacts themselves. This approach avoids potential problems associated with the possible reevaluation and reratification of compacts by individual State legislatures. The Department favors both the passage of this important legislation as well as the timely consent to the interstate compacts that have been submitted to the Congress.

S. 1517, as modified by Amendment 583, and S. 1578 correspond to H.R. 1083 before the latter was amended and reported by the House Committee on Interior and Insular Affairs. While the Department has no major objections to the final markup of H.R. 1083, we believe the proposed amendments to the Low-Level Radioactive Waste Policy Act being considered today--as well as H.R. 1083--can be further clarified and strengthened.

POTENTIAL PROBLEMS

There are two potential problems with S. 1517, as modified by Amendment 583, and S. 1578 that deserve further consideration by the Congress: (1) States' responsibilities during the transition period, and (2) the availability of disposal capacity for non-utility waste generators.

States' Responsibilities During the Transition Period

As recommended in our February 1985 report to Representative Udall concerning compact viability,[1] the Department believes that continued access by non-sited States and compact regions should be based upon progressive plans and schedules developed by those States and regions. We note that the proposed legislation does include several specific milestones that must be met to assure continued access to current disposal facilities. However, we believe that the provisions on limited availability of regional disposal facilities (section 7 of S. 1517 and section 5 of S. 1578) could be strengthened to ensure continued progress toward development of new disposal capacity by 1993.

The problem we foresee is that if a State or compact region does not meet these specific milestones, the penalties contained in S. 1517, as modified by Amendment 583, and S. 1578 accrue primarily to the waste generators within that State or compact region, either by loss of access to a disposal site or by increased disposal fees, or both. Congress may wish to clarify the specific responsibilities of States for managing their low-level waste if the milestones are not met.

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[1] Report DOE/NE-0058, "Considerations for Evaluating Proposed Low-Level Radioactive Waste Compacts," February 1985.

It would be a particularly unfortunate development if States that did not pursue compact formation or development of their own disposal facilities required their waste generators to store waste on a prolonged interim basis. This could be inadvisable from technical, environmental, financial, and policy standpoints. We believe this view is consistent with the intent of Congress when it enacted the Low-Level Radioactive Waste Policy Act in 1980, and today as it considers amending that Act.

Availability of Disposal Capacity for Non-Utility Waste Generators

The second potential problem that we foresee relates to providing assurances to non-utility low-level waste generators, such as hospitals and universities, that adequate disposal capacity is available to them at currently operating sites during the 7-year transition period that would begin on January 1, 1986. Section 5(a)(2) of S. 1517, as modified by Amendment 583, and S. 1578 may not go far enough to assure that adequate disposal capacity is available, since access is subject to "the provisions of subsections (b) through (k)...", i.e., limitations on the availability of disposal capacity. Therefore, Congress may wish to consider strengthening the language of section 5(a)(2) to assure the availability of disposal capacity during the transition period for non-utility low-level waste generators.

ADDITIONAL SPECIFIC RECOMMENDATIONS

Two additional changes that we feel should be incorporated into the final version of an amendment to the Low-Level Radioactive Waste Policy Act pertain to (1) ownership of Federal waste and (2) emergency access for national security reasons.

Ownership of Federal Waste

The Department recommends that section 4(b)(2) of both S. 1517, as modified by Amendment 583, and S. 1578 be revised so that the word "produced" is changed to the word "owned". The key phrase would then read, "...disposal of low-level radioactive waste owned by the Federal Government..." (emphasis added). This clarification is necessary because, in rare instances, the Department has accepted title to low-level radioactive waste not produced by the Federal Government.

Emergency Access for National Security Reasons

Section 5(h) of both S. 1517, as modified by Amendment 583, and S. 1578 provides for access to disposal facilities based on a determination of a threat to public health and safety. While we fully agree with the intent of such a provision, an equally essential provision should be included to assure that national security is not compromised. The Department recommends that section 5(h) be modified to allow the President or his designee to grant access to any operating disposal facility for low-level radioactive waste generated as a result of activities of the Department of Defense if there is no disposal facility in operation in the State or region of origin and disposal of the waste is required for reasons of national security. Specifically, section 5(h), EMERGENCY EXEMPTIONS, should be modified by adding new paragraph (1), as follows:

> "(1) The President or his designee may grant emergency access to any operating disposal facility for low-level radioactive waste generated by Department of Defense activities if the President or his designee determines that there is no disposal facility in operation in the State or region where the waste was generated and that disposal of such waste is necessary to assure national security."

Existing paragraph (1) and the remaining subsections should be redesignated (2) through (5), respectively.

We have reviewed this approach with Department of Defense officials, who agree with the necessity for such a provision.

DOE RESPONSIBILITIES UNDER S. 1517 AND S. 1578

Both S. 1517, as modified by Amendment 583, and S. 1578 would expand the present scope of low-level radioactive waste management activities performed by the Department.

Since 1980, the Department has assisted States to meet their responsibilities under the Low-Level Radioactive Waste Policy Act. In the past year, the Department has provided technical assistance to States and interstate compact regions for siting and developing new low-level waste disposal sites.

Orphan Waste Report

Both S. 1517, as modified by Amendment 583, and S. 1578 require that the Secretary of Energy develop and submit to Congress a comprehensive report that would recommend measures to resolve the issues related to the safe disposal of radioactive waste that is not provided for under other Federal law and for which the Secretary determines disposal as low-level waste may not be viable. This report is required to be completed within 12 months following enactment. We believe we can meet that schedule and provide recommendations to Congress for this category of radioactive waste. It is likely that implementation of the recommendations embodied in the Department's report would require additional congressional action with regard to assignment of responsibility for disposal of this category of radioactive waste. We will be pleased to provide whatever assistance is needed to support congressional consideration and determinations of these issues.

Departmental Assistance to Compact Regions and States

S. 1517, as modified by Amendment 583, and S. 1578 direct the Secretary of Energy to provide technical and financial assistance to compact regions and States for purposes of assisting them in fulfilling their responsibilities under the proposed legislation.

The Department opposes providing continued financial assistance because such additional direct financial assistance to compact regions and States will not contribute significantly to the formation of additional compacts. The Department's role should continue to be limited to providing technical assistance to States and regions, to the extent made possible by appropriations. Such technical assistance should continue to be limited to consultation and review of site selection and development planning and licensing procedures. In addition, both the Department and the U.S. Nuclear Regulatory Commission conduct programs that provide information on waste form technology, alternative disposal technology, and waste storage and treatment options.

Low-Level Waste Management System Report

S. 1517 proposes to have the Secretary of Energy prepare and submit an annual report to the Congress that would summarize the progress of low-level waste disposal siting and licensing activities nationwide. S. 1578 differs from S. 1517 in that it requires a review every 5 years.

We support the preparation of an annual report as proposed in S. 1517, but only during the 7-year transition period. An annual report will keep Congress and the States informed on a timely basis of the progress being made by the States and interstate compact regions toward development of new disposal capacity during the transition period. The need for additional reports to Congress should be examined in 1992 after completion of the transition period.

It should be noted, however, that providing the information that section 5(b) of S. 1517 requires in an annual report would require a survey of the entire waste management and disposal industry, including full disclosure of waste generation, treatment, storage, and shipping practices. It will take time to develop a comprehensive data base, since much of the information required in section 5(b) has not been sought before. Some of the information needed may be considered sensitive by waste generators or waste treatment, transportation, and waste disposal companies. The completeness of such an annual report to Congress will depend on the degree of cooperation obtained in a voluntary request for information from the organizations that generate, manage, and dispose of low-level radioactive waste.

SUMMARY

The Department believes that congressional consideration of the two potential problems we have noted in this statement will lead to a strengthened amendment to the Low-Level Radioactive Waste Policy Act. First, we believe that waste generators should not be unduly penalized--either by loss of access or in higher disposal fees--if States or regions fail to meet their obligations under S. 1517, as modified by Amendment 583, or S. 1578. Second, we believe that the availability of disposal capacity for non-utility waste generators should be assured.

In addition, we have made two specific recommendations which we believe would further clarify and strengthen both S. 1517, as modified by Amendment 583, and S. 1578. Emergency access to operating disposal sites for national security reasons should be allowed, and low-level radioactive waste disposal facilities operated exclusively for waste owned by the Federal Government should not be subject to any compact or action taken under a compact.

Finally, we continue to see a rather limited role for the Department of Energy to play as States and regions provide the necessary new disposal capacity for low-level waste generated within their borders. The Department will be pleased to continue providing technical support to compact regions and States, but opposes any provision that would require the Federal Government to provide direct financial assistance.

S. 1517, as modified by Amendment 583, and S. 1578--together with H.R. 1083--provide a useful framework for proceeding with the congressional consent to interstate compacts and development of new disposal capacity. Each proposal offers a compromise for those States that host operating low-level radioactive waste disposal sites and those States that require additional time to develop new disposal sites. The Department favors the passage of such legislation this session, as well as timely consent to the interstate compacts that have been submitted to the Congress for consideration. We encourage the Subcommittee to consider the recommendations we have made this morning and to resolve any outstanding issues that could prevent enactment of this important legislation by the Ninety-Ninth Congress.

This concludes my statement. I would be pleased to respond to any questions you may have.

Senator SIMPSON. Thank you very much, Mr. Vaughan.

Let me ask several questions. I will submit a larger number of them in writing.

Mr. Dircks, under S. 1578, the Commission or, where appropriate, an agreement State is required to make final decision on applications for a low-level waste facility within 18 months from the date that those applications are submitted to the NRC.

Could you please comment briefly on the approach that will be used by the Commission in licensing those facilities and give us some indication as to how much time you think that that might take?

Mr. DIRCKS. As you mentioned, Mr. Chairman, there are two possible licensing entities here. If they come to the State, that's one approach; and if they go to the Federal Government, to the NRC, that's another approach.

We think the 18-month limitation is probably unrealistic to get a license from the NRC. First of all, we do have a hearing requirement that would probably, in and of itself, last normally about a year. That doesn't leave very much time then for the staff analysis of the application.

We feel that the Agency, the NRC staff, could probably review an application within the 15- to 18-month timeframe, but we'd also like to point out that it does require about another year to go for a hearing.

Now, if they go to a State, the States have differing requirements, particularly in regard to hearings. The time could be somewhat expedited by going through the agreement State process.

Senator SIMPSON. As these compacts were submitted to Congress for approval different regions took different approaches toward the definition of low-level waste. In earlier testimony, before the Judiciary Committee at least, the Commission took the view that the compacts should contain a uniform definition of low-level waste so as not to create orphan categories of waste without a disposal home.

Is the Commission satisfied with the approach that S. 1578 takes with regard to that issue?

Mr. DIRCKS. John, do you—I know we've talked about that. I think that we'd want some assurance that the definitions are completely accepted through all the compacts as established by national legislation.

John, do you want to add——

Mr. DAVIS. I agree with Mr. Dircks. What we're looking for, of course, is not just a definition of low-level waste. But in some of the compacts, in NRC's review of these, it appears that there may be some opportunity for the compacts to erode the Federal regulatory regime. And we would like to see this bill make certain that—use this generic approach to make certain that this does not occur.

Senator SIMPSON. Let me ask while both NRC and EPA are here—in my time here, I have seen great scraps go on between EPA and NRC with regard to getting anything resolved when the word "radioactivity" is mentioned, and I must admit it's a rather ponderous process to observe.

Have the NRC and the EPA worked out any arrangement on how you will handle the application of RCRA to these potential low-level waste sites?

Mr. DIRCKS. I can answer first, and Mr. Meyers can pick it up where I've left some gaps. We have been working with EPA over the past 2 or 3 years in the area of developing a memorandum of understanding of how we would handle the application of RCRA to low-level radioactive sites.

I wouldn't describe these proceedings as being very fruitful. We bump into some difficulties when we come into the RCRA area and I think it's the feeling that there are some areas of RCRA that cannot be delegated to NRC as a licensing agency. That's been my observation as I've worked on this MOU with EPA, and I've discussed it both with Mr. Meyers and with Mr. Thomas.

I'll let Shelly pick it up.

Senator SIMPSON. Yes; Mr. Meyers.

Mr. MEYERS. I would agree with Mr. Dircks, but I would not like to leave the impression that either of the two agencies have not been trying to work out an arrangement. But I think the problem rests with the way the RCRA is worded. I believe under the current terms of the Resource Conservation Recovery Act, while we can arrange with NRC to deal with the site operator exclusively and have them prepare all the necessary information that would be required for a RCRA permit, it eventually would have to come back to EPA for signature, and I believe that's the way the law is structured.

I don't believe we have the authority to delegate the signatory authority to another Federal agency.

Senator SIMPSON. Well, it is my experience that there has not been anything fruitful—that's the word used—come out. When we get into difficulty with EPA and NRC in this area, it seems to me, without exception, it falls apart. I can't even identify areas where those two fine agencies ever reach an accord of any kind in this area. Something about the word "radioactivity" or "radon" or "uranium" just seems to drive them goofy. It's very tiring to watch especially as one with an oversight capacity, I can tell you that. I've seen them come and go, and I've seen the thing just continue to go unresolved.

It is real. I say that as a person that watches it and sees an impossible built-in, I guess "fear" would be a good word—fear, trepidation, whatever.

Mr. DIRCKS. One comment, Mr. Chairman. In the House bill 1083, the House committee markup, this subject is covered. And we think it could be improved, but it does discuss this area of RCRA and NRC and EPA. And we think it establishes a correct principle. We do have some concern about the relationship of the States in there, but we do think the bill that came out of that House Interior Committee does put us on a path where, at least from our perspective, it could deal with this RCRA issue.

Senator SIMPSON. Senator Stafford, do you have any questions?

Senator STAFFORD. Thank you, Mr. Chairman. Yes; I do. First, I have a letter in hand from the chairman of the Vermont Legislative Joint Energy Committee, Representative Obuchowski, and I would ask that it might be made a part of the record at this point.

Senator **Simpson**. Without objection, so ordered.

[The letter follows:]

STATE OF VERMONT

HOUSE OF REPRESENTATIVES
STATE HOUSE
MONTPELIER, VERMONT 05602

TELEPHONE (802) 828-2231

October 3, 1985

The Honorable Robert Stafford
133 Senate Hart Building
Washington, DC 20510

Dear Senator Stafford:

Members of Vermont's Joint Energy Committee have asked me to make the following comments with respect to the proposed amendments to the Low-Level Radioactive Waste Policy Act:

First, it is clear that the proposed federal scheme still depends upon a political resolution of a highly technical problem, in a way which may or may not provide satisfactory results. When representatives of Massachusetts met with representatives of the three northern New England states to discuss ways that the four states might agree to share the risks of disposal, one of the questions posed by Massachusetts was a particularly good and pertinent one. They asked, how would we as a potential compact group site a low-level waste facility if it developed that there were no adequate sites in the entire state of Massachusetts? The logical extension of that question presents the possible flaw in the federal scheme, that is, what if it develops that there are no adequate sites in all of the Northeast? Shallow land burial in the northeast basically means that burial must take place in the water. Representatives from Maine reported that in their interactions with the N.R.C., the N.R.C.'s basic approach to siting is that engineering is fine, but it must be considered as extra protection, siting must still take place in a site that is environmentally adequate. This appears to be the safest and the most sensible way to approach the issue. To the extent that the Congressionally mandated regional compact approach results in a requirement that sites be built in locations where environmental factors are not satisfactory, it requires the states in any such location to either embark on an exercise in futility or to site a facility where it should not be sited. In this respect, you might submit an amendment that would provide for the eventuality that a region is unsuccessful in locating an adequate site.

Additionally, since one of the apparent reasons for enacting the law in the first place was to prevent the host states from bearing a disproportionate proportion of the nation's waste, it fails to make sense to enact an alternative which may develop into a situation where another small generating state is bearing a disproportionate amount of the burden and is doing so in a part of the country which is less well suited to serve as a site. To address this issue, you could consider, on a national level, providing that states which generate less than a certain amount will not be eligible to be selected as a host state. This would expedite compact negotiations in that larger states would be required to fill a role which it may be difficult for them to volunteer for, yet it would further Congress's basic goal of allocating the burden of disposal in an equitable fashion while still limiting the number of sites that may have to be developed.

Although the bill is admirable in that it finally addresses options to shallow land burial, it does not go far enough in that direction. The N.R.C. is basically a regulator and not a developer or proposer. That being the case, consideration should be given to giving another body the mandate to promulgate criteria for licensing facilities which would use other than shallow land burial. Furthermore, the draft of the bill requires the N.R.C. to identify low-level waste which has a hazardous life exceeding the period of institutional control and develop standards and methods for disposal of identified material only "if it determines such standards and methods to be necessary to minimize the long-term threat to the public health and safety." We are not convinced that the N.R.C. ought to have the option of not developing those standards for Class C wastes, given the volume of this waste that is going to be generated, particularly during decommissioning, and its long-lived toxicity. Additionally, the fact that the states have the responsibility to care for Class C waste may make suitable sites less possible to find in all regions of the country. Perhaps the federal law should be amended to provide a fall-back position whereby the federal government would assume responsibility for handling the Class C waste generated within any region that does not have a suitable site to handle that waste. This waste could be disposed of as high-level waste.

As a final concern, the proposed draft clearly makes it the state's responsibility to provide for the siting of a facility for that waste which is generated within the borders of a state. However, the decommissioning mode and timetable is one which, according to other law, is strictly a matter between the licensee and the N.R.C. Unfortunately, it may be crucial to a state attempting to negotiate a compact to have some control over how much waste is likely to come into the compact site and when. That being the case, a state may want to take the position that it will provide for a particular volume of waste to be disposed of according to a particular timetable which assumes a particular decommissioning mode, and its licensee would be free to follow that timetable and take advantage of the site provided by the state, or it would be free to follow another timetable and make its own arrangements for siting. The point is, the existing draft is not clear in permitting the states to have this control over the way it exercises its siting responsibility. Perhaps the federal law could be amended so that if a state provides for disposal according to a schedule based on an acceptable decommissioning alternative, such as, ~~for~~ example, the Safestore option of decommissioning (which anticipates a 30 to 50 year storage time followed by dismantlement), then the licensees in that state would not have the option to force the state to provide them with capacity according to a timetable set by the licensee. Clearly, if a state is given the responsibility over these matters, it ought to be given the power to have some control over the scheduling of the waste which it delivers, to the extent that this control does not threaten the general public health and welfare.

Thank you for your consideration of our concerns.

Very truly yours,

Rep. Michael Obuchowski
Chairman
Joint Energy Committee

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Senator STAFFORD. I'd like to ask the representative of the Nuclear Regulatory Commission this question. I understand that concerns have been raised with respect to the environmental suitability of the Northeast for a low-level waste disposal site.

These States have been described as possibly being "too wet," to contain an acceptable site. I assume that "too wet" doesn't refer to their drinking habits either. [Laughter.]

Mr. Dircks, does the NRC believe it will be difficult to find a low-level waste disposal site in the northeastern part of the United States?

Mr. DIRCKS. I don't think we've received any detailed application from any State up there, Mr. Chairman, and we'd have to review it. I don't think we've ruled out any site in that area.

Senator STAFFORD. All right.

Now let me ask you, Mr. Dircks, a second question, and also Mr. Meyers. The NRC has testified that H.R. 1083 needs additional clarification regarding the role of States in regulating mixed waste. Mr. Dircks, other than these clarifications, is NRC satisfied with the division of responsibility between NRC and EPA for regulating mixed waste?

And then I shall ask Mr. Meyers if he is satisifed with the division of responsibility with NRC.

Mr. DIRCKS. Yes, Mr. Chairman. We believe that 1083 establishes a correct principle. We did have some comments to improve the relationship of NRC to the States, and we also had some comments about improving the clarification of the role of the agreement States in this bill.

Senator STAFFORD. Basically your answer is, you're satisified?

Mr. DIRCKS. Yes, sir.

Senator STAFFORD. Mr. Meyers, what's your response?

Mr. MEYERS. Mr. Stafford, we agree that the concept of being able to delegate the RCRA authority to NRC is an appropriate role. We have some problem with the language as to the exact wording but in principle we think that the idea of having one agency dealing with the site operator for permitting and licensing purpose is a sound one, and if EPA had the authority to delegate in a proper way RCRA responsibility to NRC, it would make sense to us.

Senator STAFFORD. Thank you.

Now, to all three gentlemen: Many States have expressed concerns about shallow land burial disposal methods. They'd like to develop alternative disposal methods; however, these States do not want to develop new methods, only to find several years later that they will not be licensed.

Section 11 of the proposed bill requires NRC to promulgate performance criteria for disposal methods other than shallow land burial. My question is: For each of the witnesses, do you believe this is an effective way to spur development of alternative disposal methods? Can you suggest other ways for the States to obtain assistance in developing methods?

I might start with you, Mr. Dircks, again.

Mr. DIRCKS. Well, we already have some performance requirements or performance standards out through existing regulations. We've done another study in conjunction with the Corps of Engineers to outline additional concepts in alternative disposal methods.

And Mr. Meyers mentioned some studies that EPA did. We believe the first, most beneficial way is for the States to consult with us and work with us in developing any of their concepts. We have not had any concepts yet advanced to us on alternative disposal methods. And I think I've got to—oh, I might mention, there is a good deal of confusion when we talk about alternative disposal. Many of the concepts we've heard discussed are really storage. It's a temporary storage method, and when we look back, we'd like to talk about alternative disposal method.

Senator STAFFORD. Thank you.

Mr. Meyers, do you have any additional comment?

Mr. MEYERS. I'd like to make a couple of points. One, I personally think that if the various organizations that operate low-level-waste-disposal facilities do them in accordance with the existing part 61 regulations of NRC, shallow land burial is a perfectly suitable way to do that.

We have, as mentioned in the testimony, done cost/benefit and environmental analyses on nine different techniques that have been brought to our attention, so that when States get down to the point of addressing which approach they choose to take, they will at least have some data base so that they can make informed decisions.

Senator STAFFORD. Thank you.

Mr. Vaughan, do you have a comment?

Mr. VAUGHAN. I would endorse what Mr. Meyers had said, and would note that the Department of Energy has, for its own wastes, been practicing shallow land burial for over 25 years with good success when it is done properly; and that the States who are now disposing of the waste have also been practicing that technique for correspondingly lesser periods of time, and it is quite adequate in our view.

Senator STAFFORD. Thank you.

Mr. Chairman, I may have some additional questions I'd like to submit in writing if that might be done and the witnesses were agreeable to responding to written questions.

Senator SIMPSON. Thank you, Mr. Chairman.

We will go in the order of appearance here, and next would be Senator McClure, then Senator Domenici, and then Senator Ford. I recognize Senator Chic Hecht of Nevada. Did you have a statement you wish to share with the group, Senator Hecht?

Senator HECHT. I have an opening statement, but rather than take more time, I'll just put it into the record. How's that?

Senator SIMPSON. Thank you very much. I appreciate that very much.

[The prepared statement of Senator Hecht follows:]

October 8, 1985

Statement of Senator Chic Hecht at Hearings on Low-Level Nuclear Waste

Mr. Chairman, the issue of low level nuclear waste disposal is very important to the nation, but it is particularly important to Nevada.

The people of Nevada have gone out of their way to be of assistance to the rest of the country in disposing of low-level nuclear waste. Nevada contains one of the three approved sites in the whole country for disposing of these wastes. Nevada has been willing to accept these wastes from sources thousands of miles away from our beautiful state.

When the American public, through their representatives in Congress, recognized the need to share the burden of low-level nuclear waste disposal, Nevada agreed to continue to accept these wastes until the other states could organize to handle waste within their own geographic regions. Nevada, for its part, joined with nearby states in a compact of the type the Congress intended.

Unfortunately, a number of states have as yet been unable to agree on a way to handle their own waste. The people of Nevada regret this, but they are not prepared to go on forever accepting the waste of states from outside the compact that Nevada has joined.

It is simply not fair for Nevada, South Carolina, and Washington to be expected to indefinitely receive all our nation's low-level nuclear waste. That is why I am a cosponsor of S. 1578.

This bill provides a series of incentives, and disincentives, to encourage those states that have not yet joined a compact to face up to their responsibilities and do the right thing.

Nevadans are generally willing to give other states the additional time to enter into the necessary compacts. The states of Nevada, South Carolina, and Washington have repeatedly demonstrated their willingness to compromise and be reasonable as legislation similar to this has moved through the legislative process in the House.

There is still time for the Congress as a whole to take the necessary action to beat the January deadline. It is in the interest of all the states of the union to pull together so the nation is not faced with the threat of major disruptions in its low-level nuclear waste disposal capability. It is my hope that the two Senate Committees with jurisdiction on this issue will move swiftly and report this legislation so that a crisis does not result in January.

Thank you Mr. Chairman

Senator SIMPSON. Senator McClure.

Senator McCLURE. Thank you, Mr. Chairman.

I'd like to follow up a little bit with respect to alternatives and part of the difficulty in developing alternatives. Many people have commented that they are reluctant to build waste incinerators because of the cumbersome licensing process.

Yet, I am informed by some of the people who have looked at that possibility, saying that incinerators are an excellent method to achieve volume reduction.

Mr. Dircks, what is NRC doing to streamline its licensing process, or is there anything that you can do to make the quest for alternatives more attractive?

Mr. DIRCKS. Well, there are a couple of points we are trying to achieve. One, we have conducted a number of studies in these areas that could lead us to develop more specific performance requirements in terms of regulatory guidance. I think that will be helpful.

Two, I think we are trying very hard to be accessible to operators or generators or waste disposers who wanted to come in and discuss these alternatives with us. There are so many unique varieties out there, I think we have to treat it in more of advanced consultation, than to put out very prescriptive requirements that may not be suitable to any particular scheme in the future.

The licensing process itself, Mr. Chairman, as you well know, is not an easy subject for me to deal with and please people. It takes a long time. It takes time up front for the proposer to develop his application. It takes time for the NRC staff to review it, and it takes time for the hearing process to work its way.

We are trying to improve it somewhat, but I don't hold any magical solutions right now that when we get into that hearing process, we can achieve any great results.

Senator McCLURE. This leads into an associated area. I don't want to get too far afield from the question of low-level waste, but when you're talking about your activities, you're talking about licensing activities and not about basic research. Most of the research which you sponsor or support is related to the licensing process.

We have had occasion to discuss before where do research activities—where is the boundary line of research activity sponsored by NRC and that which must be done by DOE and perhaps by other agencies? And maybe what we're looking at here is something that's falling between the cracks of the agency process, without a clearly defined boundary line and without clearly defined programs that delegate that kind of generic research not related to a current license application.

Are you telling us in effect that your research budget and your research activities cannot appropriately look at alternatives? Should that be done by some other Federal entity?

Mr. DIRCKS. As you and I have discussed before, Senator McClure, there is this floating boundary in our research efforts. We haven't gotten to the position of developing approaches for low-level waste or high-level waste. We do rely on the applicants to carry that burden.

But we do try to anticipate problems in these technologies and move ahead and develop enough research to enable us to ask the right questions and to anticipate where future technical problems may develop so we can take account of it in our regulatory program.

But I think you're right in that there are certain areas that we don't get into in our research program. We do try to tell the applicants they've got that burden.

Senator McClure. Mr. Dircks, this legislation would impose regulatory burdens upon Federal agencies as well as trying to stimulate State activity and the compacts and the approval of that activity here in the Congress.

Do you have a budget that is adequate to meet the timetables that are established in this legislation, and can you meet the timetables if you had an adequate budget?

Mr. Dircks. Senator McClure, we have submitted what the budgetary impact would be if we were asked to do everything that the legislation required us to do, if we had to do everything the legislation required to do. We think some of the rulemaking effort that was outlined in the legislation probably could be better accomplished through regulatory guidance or the development of staff approaches, rather than going through a rulemaking action.

But the short answer to your question is, we don't have the resources in our current budget to do everything that the Congress looks like it might ask us to do.

Senator McClure. I would be very concerned if the timetables that are established in this legislation could not be met because of our failure to look at the requirements we imposed upon the Federal agencies. I'm very concerned because obviously in 1980, we thought by 1986 the problem would have been resolved. And that was perhaps overoptimistic.

And now we are looking at a process that will extend that by another 5 to 7 years and some people are telling us that's too long, and you're telling us that you may not be able to meet that, and perhaps your budget isn't adequate even to meet the timetables we've established.

Mr. Meyers, is that same thing true with respect to EPA?

Mr. Meyers. As I mentioned, Senator, our role is really quite limited in this arena. For example, the regulation that we will promulgate will be implemented by NRC. We don't have an implementation role there, and since it is a generally applicable standard it should not afford great difficulty for either NRC or the facility operators to implement.

Senator McClure. Mr. Vaughan.

Mr. Vaughan. Senator McClure, I believe we have enough money in our budget categories to do what we're being asked, as long as it is limited to providing the type of technical assistance which we've done in the past.

We do not have any funds to provide direct financial assistance to the States.

Senator McClure. What if the States wanted to come in with a plan that was somewhat different than just the current shallow earth disposal?

Mr. VAUGHAN. I think we could assist in evaluating the technical aspects of that plan. It would depend on the nature of the plan as to whether we had any R&D funds to assist in doing it.

Senator McCLURE. You have no plans now for R&D in that area.

Mr. VAUGHAN. We have very limited plans for R&D in that area. I would note that volume reduction through compaction is not a very high technology area, has been practiced in Department of Defense facilities for a number of years, and can be successfully done. I've personally watched it done and encouraged it.

We have had some limited programs and they are continuing with development of incinerators for institutional use, such as at hospitals and universities.

Senator McCLURE. Mr. Meyers, if EPA were to clean up a Superfund site during the next 7 years and found that some of the wastes contained low-level radioactive materials, how would those wastes be disposed of?

Mr. MEYERS. Currently they would probably go to a licensed facility, one of the three that are in existence today, or any of the newer ones that might be developed under this act.

Senator McCLURE. During the 7 years until something new, you have no alternative except—so far as your current policy, you would develop no new alternative except to go to one of the licensed sites?

Mr. MEYERS. Well, as you know, Senator, we would go through an analysis that would have several phases to it. One would be to look for a disposal facility within the State that generated the waste. If one wasn't there, then a storage facility might be considered perhaps. And if that was not available, then we would try to have the waste go to an existing low-level waste disposal site, of which there are only three.

Senator McCLURE. Does that imply an order of priority? Does your answer indicate your priority in solution?

Mr. MEYERS. As a practical matter, the only real solution that we've had is to utilize one of the existing sites. Invariably the States just don't seem to be very cooperative in providing storage facilities in the State.

Senator McCLURE. That's part of the conversation I've had with a number of Governors from generating States who would like us simply to lift any timetable, to which I have invariably responded: No, Governor, that's too easy. Because that doesn't move them toward any ultimate solution at all. They want to continue to keep on shipping to the receiving States and that's fine for 47 States but there are three that don't like it.

That's why we passed the act of 1980, to try to move us towards a resolution of that, and I am very much concerned as to whether or not we will actually get there under these rules.

Might I ask a question of at least Mr. Dircks and Mr. Vaughan about the suggestion that's been made by the House Committee on Interior and Insular Affairs that we up the pressure with respect to the emergency provisions that are now in the bill and make those emergency provisions more carefully hedged and more stringent?

Do you have an opinion as to whether or not the emergency access provsions are too lenient, too easily utilized, or whether we should make some changes in that?

Mr. DIRCKS. Senator McClure, we think that the emergency access provisions in that bill are quite rigid right now. In fact, just looking at it, it would be very hard to—it's going to be a very hard case to make, to get permission under that emergency access provision to ship wastes to other facilities.

Senator MCCLURE. Mr. Vaughan.

Mr. VAUGHAN. Senator, I have not studied that question in great detail, but we do encourage making those provisions as strong as possible, with the objective of getting the States to take on their responsibilities and not pass the penalty to the generators.

Senator MCCLURE. Could you look at that a little more closely and——

Mr. VAUGHAN. I'd be glad to provide a more detailed answer for the record.

[The information follows:]

EMERGENCY PROVISIONS

DOE believes the emergency provisions included in H.R. 1083, "The Low-Level Radioactive Waste Policy Amendments Act of 1985," as reported out of the House Committee on Interior and Insular Affairs, provide adequate measures for access to low-level waste disposal sites in the event the public health or safety is threatened. However, we have requested in our oral testimony and written statement that similar provisions be added to cover instances where national security activities are affected. We do not believe any further strengthening of these provisions is necessary.

Senator MCCLURE. Thank you.

Mr. Chairman, I have some additional questions which I will submit for the record for response in writing.

Senator SIMPSON. I thank you.

Senator Domenici.

Senator DOMENICI. Mr. Meyers, let me ask, when Senator Simpson asked the question with reference to EPA and NRC as it applies to RCRA, he indicated that it appeared that you weren't able to work those kinds of things out in the past, occasions of this type, at least to his memory.

Your response was that in this regard you were greatly inhibited, restricted, or whatever the word is by the existing law.

Might I ask—not at this time—but would you for the record, submit to us what there is about that law that makes it impossible for you to arrive at the conclusion that was contemplated by the Congress? Can you do that for us?

Mr. MEYERS. Certainly, Senator.

Senator DOMENICI. I'd appreciate it.

Let me ask—I came here today basically committed to the proposition that States ought to get on with this, and that surely the citizens of this country didn't understand what was going on or they would get on with it. We're talking here about whether we're going to have the excellent kind of diagnostic care and treatment that we have in our hospitals; whether we're going to have much of the cutting edge of surgery and treatment in hospitals; whether we're going to have some of the new cancer treatments around that everybody thinks are putting America on the cutting edge of maybe finding a cure to this thing.

We are trying to make everybody use smoke detectors, and clearly a byproduct of smoke detectors, when they are worn out, have to go to one of these sites and you have to get rid of it; pharmaceutical research and the end product of development of new pharmaceutical techniques and prescription kinds of drugs result in some of these kinds of wastes being generated. Nuclear plants that already exist and are there being run yield gloves and all kinds of things and garments that have to be disposed of.

So it would seem to me that generally, if everybody knew that and knew that there was going to be a consequence to them and the citizens of their State, that something would be done.

Now, I'm not so sure, having heard this testimony, that that is the case; that it's their fault. I came here saying maybe we ought to talk to Senator McClure, and I said maybe what we ought to do when we get to 1990, instead of just cajoling and saying where's your certification, that maybe we ought to take 10 percent off all the block grants for the States that haven't made a deal and say, OK, if you don't want to do it, we're just going to take some money away from you because this is the kind of thing you ought to do.

Now, I have a growing concern that we might have botched this up so that they can say we don't know what to do. So let me ask all of you experts, is it clear that but for laws that we have on the books that cause confusion, that there is a way to dispose of this kind of waste?

Let me put it even more broadly; more than one way to dispose of it in a safe manner now, in the United States, at a reasonable price? What's the answer to that question?

Mr. **Dircks**. First, Senator Domenici, I'll say yes, there is no question, at least in my mind, that there is a way to dispose of those wastes safely and in an environmentally satisfactory manner.

Senator **Domenici**. What do you say, Mr. Meyers?

Mr. **Meyers**. I agree.

Senator **Domenici**. And what do you say, Mr. Vaughan?

Mr. **Vaughan**. I agree.

Senator **Domenici**. All right. If there is, what excuse do the States have, other than it's a politically viable issue? Do they have an excuse that we now have laws on our books that cause them to be unable to determine how, when, why and the like? Or is the excuse that they just don't want to get around to it?

Do you have an answer? If you don't, call some Governors and ask them.

Mr. **Dircks**. I think you'd better ask the Governors that question.

Senator **Domenici**. Well, then give me your opinion about it.

Mr. **Dircks**. I don't think there's any technical reasons why these sites could not be located right now and developed. We have the regulatory guidance out there. We have enough experience with low-level waste sites that such sites could be located and operated satisfactorily.

Senator **Domenici**. In a timely manner?

Mr. **Dircks**. In a timely manner.

Senator **Domenici**. Do you agree, Mr. Meyers?

Mr. **Meyers**. I agree.

Senator DOMENICI. Then what is it? Is there any technical statutory prohibitions, inhibitions, that they could claim on their side that you're aware of, any of you, Mr. Vaughan, Mr. Dircks, Mr. Meyers?

Mr. VAUGHAN. I am not aware of any. I think the answer is evident on the face of it. Three States have been doing it satisfactorily for a number of years and the Department of Energy has been doing it for its own generated waste. So the wherewithal is there to do it.

Senator DOMENICI. So all these questions that have to do with arriving at standards under RCRA that you're going to address, Mr. Meyers, that cause some confusion between your role and the NRC's role, that's ancillary to this issue?

Mr. MEYERS. Completely.

Senator DOMENICI. All right. In the questions that we've asked about how long it takes to get these things done, the answers have been guarded as to whether there's enough time to do all your work, but nonetheless, if you're talking about 1990 or 1992, clearly if they want to get on with it, it can be done; is that correct?

Mr. DIRCKS. It's a procedural issue and yes, it can be done. We'll work to improve the procedures, but it can be done.

Senator DOMENICI. Then would you all conclude that from what you have seen out there—and some of you have to be involved out in the sovereign States, I assume, in hearings and in talking with Governors and legislators and others—would you assume that it is, in your opinion, merely a lack of desire on the part of the respective States to get on with solving this problem?

[Pause.]

Senator DOMENICI. I take it you don't want to answer that. Thank you very much.

Mr. MEYERS. Senator, let me just say something. The siting of any kind of disposal facility is always very difficult.

Senator DOMENICI. I understand.

Mr. MEYERS. Ranging from a sanitary landfill on one end of the spectrum, to a low-level waste facility, a hazardous waste facility, to high-level waste disposal facilities on the other end.

As you know, the High-Level Waste Policy Act of 1982 addressed that particular issue with certain dates. But I think you can see, by virtue of the DOE announcements in that arena and the reaction from the various States, that it will not happen easily.

In Montgomery County, they sited a land fill up in Laytonsville. The discussion on that particular facility went on for years before the county was able to open it up. It just happens to be a "not in my backyard" syndrome.

Senator DOMENICI. I understand. But I'm trying to also make a point that the wastes we're speaking of here, where they may generate some kind of fear and "not in my backyard" syndrome, that they have to do with the continuation of some very desirable things by all of the constituents of the country. I mean, I don't think there are very many, if we ended up with a law saying everyone does their own thing and if you don't have it ready in your State, you close down all the new cancer diagnostic treatments within a State; you close down the utilities because they can't get rid of the gloves of those who are in there that have to be covered up while they work.

We're not talking about the rods that come out of the nuclear process. That's why I started with the question no doubt that it can be disposed of safely. That's really not an issue. And you established that.

I thank you very much.

Senator **Simpson**. Would you like to subpoena the Governors of California, New York, Pennsylvania, and Massachusetts? That would get you started.

Senator **Domenici**. Frankly, I don't desire to subpoena any of them. I just desire that we find a way to make them cooperate with each other and do their job.

Senator **Simpson**. Well, there is the issue. There are four States right there that generate over a quarter of the waste we're talking about and none of them are in. Then you take up the other States, look at the list of those who have not participated, and there we are.

It's the same with high-level waste. When we get to that, we've already seen what happened when they directed where that might go. Everyone went absolutely bananas. So that's where we are. It is funny, but it isn't funny. Nobody wants the stuff and everybody wants to do something about it—everybody. But we don't do it.

Senator Ford, it's nice to have you here.

Senator **Ford**. Thank you, Mr. Chairman.

Let's follow up on Senator Domenici's question. All three of you said there was no problem today to go ahead and develop a site safely and that sort of thing.

Let me then ask this question: Why Sheffield, IL is closed; why is West Valley, NY closed; and why is Maxi-Flats in Kentucky closed?

Anybody who wants to answer that, come forward.

[Pause.]

Senator **Ford**. I think they're shifting it to the associate that came with them today. [Laughter.]

Mr. **Davis**. I think, Senator Ford, there is one point I would like to make, is that there have been difficulties with the three sites which you mentioned. However, those difficulties have been converted by the Federal Government regulatory agency into learning experiences.

Senator **Ford**. Has been done what by the Federal Government?

Mr. **Davis**. Has converted to learning experiences.

Senator **Ford**. Oh, it's become a learning experience.

Mr. **Davis**. Well, it permits us to learn. And so consequently, our new part 61, which is the current regulations which would regulate these types of sites, we believe provide adequate safety.

Mr. **Meyers**. Senator Ford, on a couple of those sites, I believe, the one in West Valley, NY, was not designed properly.

Senator **Ford**. Who is in charge of seeing that the design is proper?

Mr. **Meyers**. I think that was NRC licensing.

Senator **Ford**. Here we go now, you see. This is part of our problem right here, Mr. Chairman.

Mr. **Dircks**. The first responsiblity to assure that it's designed satisfactorily rested with the entity that was proposing to operate it, and that was I think the New York State agency under the regime of, I think, Governor Rockefeller many years ago. They proposed it.

They also proposed a reprocessing facility at West Valley, and they were going to store low-level waste and spent fuel and operate a reprocessing facility. I think, as a result of some of the changes in that industry, the reprocessing facility was closed down.

The desire then was on the part of the State to get out of it. The facility was licensed I think, under the Agreement State Program of New York State, the low-level waste site.

Senator Ford. So it was licensed by New York State and there was no Federal oversight.

Mr. Dircks. Under our provisions, we delegate to the agreement States, licensing authority. And in that case, the low-level waste site was a New York State licensed site.

Senator Ford. Well, let me go back to Mr. Meyer's statement early on that said, if I am correct Mr. Meyers, you said on the elimination of the confusion between EPA and NRC and so forth, that you like the concept; am I correct it's the language of the legislation that is a problem?

Mr. Meyers. On mixed waste?

Senator Ford. Yes.

Mr. Meyers. We agree with the idea of delegation to NRC.

Senator Ford. Well, the problem I found here is that most of us agree on the concept but disagree violently with the language. Are you satisified with the language?

Mr. Meyers. Not completely. There are some changes in the language that we would propose to make that would make it consistent with the delegation we give to the States, for example.

Senator Ford. So it would be some time—you've been working 3 years now to work out some kind of cooperative atmosphere without legislative language; is that right, Mr. Dircks?

Mr. Dircks. That's right, Senator. We've worked on that issue for about 2 to 3 years. We've come close a couple of times, but as Mr. Meyers pointed out, they feel that under the statute, they cannot delegate to another Federal agency their responsibilities under RCRA.

Senator Ford. Let me get into one other quick question. I have two more questions, and then I have some also that will be submitted in writing.

What is the actual cost of low-level waste disposal under the current NRC regulations?

Mr. Dircks. You mean the cost of operating the facility, Senator, or the cost of a license?

Senator Ford. The cost of operating. Just a total cost. If I wanted to put some low-level waste in, what would it cost me?

Mr. Dircks. Oh, there are charges levied by the individual States on a cubic foot basis in South Carolina, Washington, and Nevada. I think I would have to get that exact cost for you for the record.

[The information follows:]

At the hearing before the Senate Committees on Energy Natural Resources and Environment and Public Works held on October 8, 1985 concerning legislation on low-level radioactive waste (LLW) disposal, a question was raised regarding the prices charged by the commercial LLW operators. Mr. Dircks indicated that he would provide this information for the record. Rate schedules of US Ecology for the commercial LLW disposal facilities located near Beatty, Nevada and Hanford, Washington; and the rate schedule of Chem-Nuclear Systems, Inc. for the disposal site near Barnwell, South Carolina are enclosed for inclusion in the hearing record.

[Attachments: As stated.]

US Ecology Inc
9200 Shelbyville Road Suite 300
P O Box 7246
Louisville Kentucky 40207
502 426-7160

US ECOLOGY
NEVADA NUCLEAR CENTER
SCHEDULE OF CHARGES
RADIOACTIVE WASTE

USEcology EFFECTIVE: January 16, 1984

1. DISPOSAL CHARGES

A. SOLID MATERIAL

Steel Drums, Wood Boxes:

R/HR AT CONTAINER SURFACE	PRICE PER CU. FT.
0.00 - 0.20	$ 17.85
0.201 - 1.00	19.37
1.01 - 2.00	21.79
2.01 - 5.00	26.58
5.01 - 10.00	31.42
10.01 - 20.00	40.71
20.01 - 40.00	50.51
40.01 - 60.00	77.37
60.01 - 80.00	92.91
80.01 - 100.00	102.48
Over 100.00	By Request

Disposal Liners Removed from Shield: (Greater than 12.0 cu.ft. each)

R/HR AT CONTAINER SURFACE	SURCHARGE PER LINER	PRICE PER CU. FT.
0.00 - 0.20	No Charge	$ 17.85
0.201 - 1.00	$ 243.00	17.85
1.01 - 2.00	598.00	17.85
2.01 - 5.00	842.00	17.85
5.01 - 10.00	1,217.00	17.85
10.01 - 20.00	1,553.00	17.85
20.01 - 40.00	1,930.00	17.85
40.01 - 60.00	2,288.00	17.85
60.01 - 80.00	2,641.00	17.85
80.01 - 100.00	2,999.00	17.85
Over 100.00	By Request	By Request

B. Liquid Scintillation Vials $23.55/cu.ft.

C. Biological Waste, Animal Carcasses $19.40/cu.ft.

US Ecology, Inc.
9200 Shelbyville Road, Suite 526
P.O. Box 7246
Louisville, Kentucky 40207
502 426-7160

US ECOLOGY
WASHINGTON NUCLEAR CENTER
SCHEDULE OF CHARGES
RADIOACTIVE WASTE

USEcology

EFFECTIVE: August 1, 1985

1. DISPOSAL CHARGES

A. SOLID MATERIAL

Steel Drums, Wood Boxes:

R/HR AT CONTAINER SURFACE	PRICE PER CU. FT.
0.00 - 0.20	$22.14
0.201 - 1.00	23.79
1.01 - 2.00	26.36
2.01 - 5.00	27.56
5.01 - 10.00	32.07
10.01 - 20.00	40.88
20.01 - 40.00	50.08
40.01 - 60.00	71.32
60.01 - 80.00	85.11
80.01 - 100.00	93.66

Disposal Liners Removed from Shield: (Greater than 12.0 cu. ft. each)

R/HR AT CONTAINER SURFACE	SURCHARGE PER LINER	PRICE PER CU. FT.
0.00 - 0.20	No Charge	$22.14
0.201 - 1.00	$ 329.74	22.14
1.01 - 2.00	564.30	22.14
2.01 - 5.00	791.82	22.14
5.01 - 10.00	1,145.35	22.14
10.01 - 20.00	1,462.08	22.14
20.01 - 40.00	1,815.62	22.14
40.01 - 60.00	2,153.54	22.14
60.01 - 80.00	2,484.76	22.14
80.01 - 100.00	2,822.68	22.14

B. LIQUID WASTES

1. In vials, less than 50 ml. each	$28.30/cu.ft.
2. Liquids containing organics, absorbed	28.30/cu.ft.
3. Aqueous liquids, absorbed	22.14/cu.ft.

C. BIOLOGICAL WASTE, ANIMAL CARCASSES 23.79/cu.ft.

(Continued)

WASHINGTON STATE

INCLUDED IN ITEM 1 ARE THE FOLLOWING WASHINGTON STATE FEES:

A.	PERPETUAL CARE AND MAINTENANCE	$1.75 PER CU. FT.
B.	SITE CLOSURE FUND	0.25 PER CU. FT.
C.	RADIOACTIVE WASTE SURVEILLANCE SURCHARGE	0.45 PER CU. FT.

2. SURCHARGE FOR HEAVY OBJECTS:	
Less than 10,000 pounds	No Charge
10,000 pounds to Capacity of Site Equipment	$172.70 plus 9¢ per lb. above 10,000 lbs.
3. SURCHARGE FOR CURIES (Per Load):	
L[illegible] than 100 curies	No Charge
[illegible] curies	$1,257.30 plus 17¢/Ci above 100 C
301 - License Limits	By Request
4. SURCHARGE FOR SPECIAL NUCLEAR MATERIAL (SNM)	$2.27 per gram of Special Nuclear Material by Isotope Weight
5. MINIMUM CHARGE PER SHIPMENT	$387.00
6. CASK HANDLING FEE:	$638.00 minimum each
7. WASTE CONTAINING CHELATING AGENTS IN PACKAGES AMOUNT GREATER THAN 1% OF PACKAGE VOLUME:	By Request
8. SURCHARGE FOR NON-ROUTINE MAN-REM EXPOSURE (DUE TO DESIGN OR PHYSICAL DEFECT OF CONTAINER OR SHIELD)	$23.71 per man millirem
9. DECONTAMINATION SERVICES (If required)	$86.15 per man hour plus supplies at cost plus 21%

10. CONTAINER VOLUMES:

55 Gallon Drums - 7.50 cu.ft.
30 Gallon Drums - 4.01 cu.ft.
5 Gallon Drums - 0.67 cu.ft.

11. All waste material shall be properly classified, described, packaged, marked, labeled, and certified in accordance with all applicable Federal, State, and Local laws, rules and regulations and shall be in compliance with all license requirements and amendments thereto applicable at the Richland, Washington disposal facility.

12. This Schedule of Charges does not constitute an offer of contract which is capable of being accepted by any party and is subject to change solely upon notice by US Ecology.

Effective August 1, 1985
Washington Nuclear Center

BARNWELL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY RATE SCHEDULE

All radwaste material shall be packaged in accordance with Department of Transportation and Nuclear Regulatory Commission regulations in Title 49 and Title 10 of the Code of Federal Regulations, CNSI's Nuclear Regulatory Commission and South Carolina Radioactive Material Licenses, CNSI's Barnwell Site Disposal Criteria, and amendments thereto.

1. BASE DISPOSAL CHARGES: (Not including Surcharges and Barnwell County Business License Tax)

A.	Standard Waste	$\$\,25.112/\text{ft.}^3$
B.	Biological Waste	$\$\,26.112/\text{ft.}^3$
C.	Special Nuclear Material (SNM) plus $1.75 per Gram SNM	$\$\,25.112/\text{ft.}^3$

Note: Minimum charge per shipment, excluding Surcharges and specific Other Charges is $500.00

2. SURCHARGES:

A. Weight Surcharges (Crane Loads Only)

Weight of Container	Surcharge Per Container
0 - 1,000 lbs.	No Surcharge
1,001 - 5,000 lbs.	$ 275.00
5,001 - 10,000 lbs.	$ 550.00
10,001 - 20,000 lbs.	$ 825.00
20,001 - 30,000 lbs.	$1,100.00
30,001 - 40,000 lbs.	$1,650.00
40,001 - 50,000 lbs.	$2,200.00
greater than 50,000 lbs.	By Special Request

B. Curie Surcharges:

Curie Content Per Shipment	Surcharge Per Shipment
0 - 1	No Surcharge
1.1 - 5	$ 1,500.00
5.1 15	$ 2 250.00
15.1 - 25	$ 3,000.00
25.1 - 50	$ 4,500.00
50.1 - 75	$ 5,500.00
75.1 - 100	$ 7,450.00
100.1 - 150	$ 8,900.00
150.1 - 250	$12,000.00
250.1 - 500	$15,000.00
500.1 - 1,000	$18,000.00
1,000.1 - 5,000	$24,000.00
Greater than 5,000	By Special Request

Effective July 15, 1985

Barnwell Rate Schedule
Page Two

C. Special Handling Surcharge may apply on unusually large or bulky containers. These type containers are acceptable upon approval of prior request.

3. OTHER CHARGES

A. Cask Handling Fee — $600.00 per cask, minimum

B. Taxes and Special Funds

1. Perpetuity Escrow Fund — $ 2.80 per ft.^{3}

2. South Carolina Low Level Radioactive Waste Disposal Tax — $ 4.00 per ft.^{3}

3. Southeast Regional Compact Fee — 46.2¢ per ft.^{3}

4. Barnwell County Business License Tax:

A 2.4% Barnwell County Business License Tax shall be added to the Total of all disposal fees.

NOTE: Items 3.B. 1, 2, and 3 are included in Item 1, Base Disposal Charges.

4. MISCELLANEOUS:

A. Transport vehicles which are provided with additional shielding features may be subject to a minimum handling fee of $150.00 per use. Such a fee covers additional handling and labor required for special equipment set up and temporary shield removal.

B. Decontamination services (if required): $75.00 per man-hour plus supplies at current CNSI rate.

C. Customers may be charged for all special services as described in the Barnwell Site Disposal Criteria.

D. Terms of payment are NET 30 DAYS upon presentation of invoices. A service charge per month of 1-1/2% shall be levied on accounts not paid within thirty (30) days.

Effective July 15, 1985

(2515g)

Senator **Ford**. What is the relationship, if you have studied this legislation, of the cost of the surcharges proposed under S. 1578 to the actual cost?

Mr. **Dircks**. We have not really gotten into that, unless somebody else has the answer.

Senator **Ford**. Mr. Vaughan, do you have any?

Mr. **Vaughan**. I do not have a specific answer to that.

Senator **Ford**. Mr. Meyers.

Mr. **Meyers**. No.

Senator **Ford**. Well, under the present rules and regulations, as I understand it, at the three sites that are being operated, NRC would allow certain things to be deposited that cannot be deposited under EPA rules and regulations.

Is there any conflict between the operation of the sites on what's allowable?

Mr. **Dircks**. I don't think there's any conflict there, Senator. I think what we were trying to get to in our various dealings with EPA was a procedure that would allow one Federal agency to be a licensing agency and not have two Federal agencies in the business of issuing a license to a single applicant.

That has been the thrust of our dealings with EPA, and I think that's where we've been trying to get some improvements.

Senator **Ford**. Having been a Governor at one time, I understand what's out there. It's just like this place. Anything emotional becomes political. And so this is emotional; it becomes political; and the Governor says no, and that's rah-rah. And there's not many rah-rah's out there for you, though, so you take all the rah-rah's you can get.

So I understand why these items. But, Mr. Vaughan, I think that was one point you made, to tighten up the bill. And do you have some options that might be suggested if a State misses its milestone?

Mr. **Vaughan**. I would be glad to provide some advice, although frankly I felt it was more appropriate for the drafters of the bill to suggest the language, since this was not originally a piece of legislation that we proposed.

Senator **Ford**. Well, you made some suggestions about tightening it up. That's just like the fellow who said, how are you going to get rid of the German U-boats on the east coast? And the other one said, drain the Atlantic Ocean. Somebody said, how do you do that? He said, oh, I'm just an idea man; that's your problem. [Laughter.]

Mr. **Vaughan**. We would be glad to suggest some specific improvements that could be made.

Senator **Ford**. Mr. Chairman, I do have some questions. The hour is getting late, and we have a long list, and I will submit some questions. But I want this question answered by all three, if I may, Mr. Chairman.

Each of them have made suggestions as it relates to the way we should proceed. I'd like to have Mr. Meyers, Mr. Dircks, and Mr. Vaughan and their staffs look at the suggestions and testimony of the other two, and make comments on how they feel those recommendations would apply, based on your feeling. And maybe at that point, we can bring all three of these together with comments as it relates to the others, and we can sift from that an agreement maybe.

You're the experts, as Senator Domenici said a few moments ago; we're not. And if you can't give us a comprehensive, cohesive direction, rather than have all of this bureaucratic language—you know, the concept's good, but never agree on the language—I would hope that that could be done.

So if the three of you would do that in a short period of time, I think it would be very helpful. And I thank the chairman for allowing me to participate this morning.

Senator **Simpson**. Thank you, Senator Ford.

Did you have any thought about that time limit that you speak about there?

Senator **Ford**. I'm not sure. I'd like to get something before we get out to where we might be able to make some kind of judgment as it relates to this legislation. And I think it's important that we look at the charges. I think that's one thing that is going to be significant. I think we have to have that. Some are saying increase the charges in outyears. I think maybe it might be in order to reverse that and reduce it in the outyears.

I'm not sure that's right. It's like natural gas. The more you buy, the less it costs. If the more you buy the more it costs, you might have more conservation than you realize. But I'm not sure how we would operate, but I do need this advice, and I think it's important for me to make some kind of a judgment in a timely—is 2 weeks too long?

Mr. **Vaughan**. Mr. Chairman, Mr. Ford, Mr. Dircks, and I just consulted, and we're about to offer 2 weeks, and so we'd be pleased with that.

Senator **Ford**. Two weeks. Is that all right with you, Mr. Meyers?

Mr. **Meyers**. Yes.

Senator **Ford**. OK, so a couple of weeks. And I do appreciate your cooperation.

[The information follows:]

SENATOR FORD'S QUESTION

Question: What are EPA comments on the NRC and DOE testimonies?

Answer: In his testimony, William J. Dircks, Executive Director for Operations, NRC, requested further clarification in Section 15(c) of H.R. 1083 regarding the role of the States in regulating mixed-wastes. We agree with the NRC that further clarification is needed. It should be clarified that the delegation of RCRA permitting and enforcement authority for mixed wastes supersedes any prior authorization by EPA for States to issue permits inder RCRA to NRC-licensed disposal facilities. However, it should be further clarified that this delegation to NRC and retraction of State authorization applies only to "mixed-waste" and not to hazardous waste that is not radioactive or hazardous waste that is mixed with a radioactive waste subsequent to its production.

In a second matter, Mr. Dircks requested clarification as to whether the delegation of RCRA authority from EPA to NRC can in turn be delegated by the NRC to agreement States authorized to regulate low-level waste disposal facilities under Section 274B, of the Atomic Energy Act. We agree that clarification is needed. It should be specified that NRC may authorize its agreement States to issue RCRA permits for mixed-waste disposal at agreement State-licensed disposal facilities, and that the State would carry out this function under NRC oversight.

10/18/85

NRC has reviewed the testimony provided by the Department of Energy (DOE) and the Environmental Protection Agency and would like to submit the following comments for the record.

Comments on Testimony of James W. Vaughan, Jr., Acting Assistant Secretary for Nuclear Energy, U.S. Department of Energy (DOE).

The Commission agrees with Mr. Vaughan's statement that S.1517 as modified by Amendment 583, S.1578, and H.R.1083 as reported by the House Committee on Interior and Insular Affairs provide a useful framework for proceeding with Congressional consent to compacts and development of new low-level waste disposal capacity. The Commission also agrees with DOE that the proposed amendments to the Low-Level Radioactive Waste Policy Act can be further clarified and strengthened, and has provided detailed recommendations in this regard.

With respect to States responsibilities during the transition period, the Commission agrees with DOE that the legislation could be strengthened to ensure continued progress by States toward development of new disposal capacity by 1993. The Commission further concurs in DOE's concern about storage of waste on a prolonged interim basis should the States fail to establish new disposal capacity. From a public health and safety standpoint, the Commission continues to favor prompt disposal to the extent practicable. In detailed comments on H.R.1083, the NRC has recommended that State certifications to manage wastes after 1992 if the 1990 siting milestone is not met need to be backed by enforceable instruments and implementation plans. This would help ensure that States would meet commitments to the waste generators within its borders, as stated in the certification. NRC has also recommended that identification of potential siting areas by 1988 will be necessary in order to meet the 1990 milestone.

The Commission also supports DOE's recommendation that Section 4(b)(2) of both S.1517 as modified, and S.1578 be revised so that the word "produced" is changed to "owned" by the Federal government. We submitted an identical recommendation in our detailed comments on H.R.1083.

Mr. Vaughan offered several other suggestions for Congressional consideration for which we would have no objections. In particular, the Commission would not object to:

o Strengthening the language of Section 5(a)(2) to assure the availability of disposal capacity during the transition period for non-utility low-level waste generators.

o Authorizing the President or his designee to grant emergency access to an operating disposal facility for Department of Defense waste for national security reasons.

- Limiting DOE's role to providing technical, rather than financial assistance to States and Compacts.
- Directing preparation of annual reports by DOE on nationwide low-level waste disposal facility siting and licensing activities during the transition period.

The Commission would like to indicate its concern over Mr. Vaughan's statements regarding the "orphan waste" report provided for in S.1517 as modified, S.1578, and H.R.1083. DOE indicated the likelihood that implementation of the recommendations embodied in this DOE report would require additional Congressional action to assign responsibility for disposal of orphan waste. The Commission continues to believe that Congress should resolve the question of disposal responsibility for "orphan wastes" in the pending legislation and that such responsibility would most appropriately be assigned to DOE. We do believe a report providing detailed recommendations on the implementation of such responsibilities is needed. We also believe that the Secretary of the Department should have considerable flexibility in devising plans to meet these new responsibilities. Clearly, there are a range of technical and management approaches to evaluate, some of which may not be deemed feasible following detailed scrutiny. However, a fair amount of technical information already exists on the sources, types, and quantities of "orphan waste" and the technologies available to manage and dispose of such wastes safely. We do not believe the outcome of the study now described in the proposed legislation would present any significant new technical information suggesting that assignment of responsibility to the Federal government would be ill-considered. The key unanswered question is the matter of institutional responsibility for ultimate disposal. Rather than leaving this important issue to uncertain future action, we believe the Congress should act now.

Comments on Testimony of Sheldon Meyers, Acting Director, Office of Radiation Programs, U.S. Environmental Protection Agency (EPA).

The Commission supports EPA's effort to promulgate federal standards for disposal of low-level radioactive waste, and will continue to provide input to EPA during the standards development process. We also agree that wastes which would be below regulatory concern from a radiological standpoint, alternative disposal methods, and naturally-occurring and accelerator produced radioactive material (NARM) wastes can usefully be addressed in this process.

However, we believe any further delays in promulgating the standard could well impede timely development of a stable, national system for low-level waste disposal. For this reason, we would urge the EPA to undertake all reasonable efforts to complete the final standard by early 1987, the target date alluded to in Mr. Meyers' testimony. We would also like to emphasize our continuing commitment to work cooperatively with the EPA to help realize this goal.

10/18/85

DRAFT ANALYSIS OF PROPOSED NRC AMENDMENTS
TO THE
LOW-LEVEL RADIOACTIVE WASTE POLICY AMENDMENTS ACT OF 1985

I. HOME FOR ALL RADIOACTIVE WASTES

Since H.R. 1083 was originally introduced by Congressman Udall on February 7, 1985, the Commission has expressed its concern on the importance of having a state or federal disposal "home" for all radioactive wastes. Five basic issues need to be addressed: (1) specific statutory language assigning federal responsibilities for disposal of commercial low-level radioactive wastes (LLW) not the responsibility of the states; (2) statutory authority over disposal of radioactive wastes not subject to the Atomic Energy Act; (3) whether or not NRC should license the disposal of those commercial radioactive wastes that become the responsibility of the DOE; (4) DOE collection of fees for disposal of commercially generated waste and the date by which the DOE shall provide disposal of commercial LLW that is not the responsibility of the states; and (5) states and compacts should not be precluded from accepting above class C waste in the event they elect to do so and the necessary regulatory approvals can be obtained. These five issues are discussed below.

1. STATUTORY LANGUAGE CONCERNING FEDERAL RESPONSIBILITIES

Specific Commission language to address these concerns was sent to the House Subcommittee on Energy and the Environment in the letter from Chairman Palladino to Chairman Udall of June 4, 1985. As originally introduced, H.R. 1083 would assign the federal government responsibility for wastes exceeding Class C limits. It provided that the federal government shall be responsible for "ensuring the safe disposal of ... (D) all other radioactive waste material that is not a responsibility of the States under subsection (a)... [other than mill tailings.]"

The Commission supported this language in Mr. Udall's original version of H.R. 1083. The Commission noted an apparent inconsistency, however, between this language and the paragraph that followed it in the bill (see page 4 of analysis accompanying the Chairman's June 4, 1985 letter to Mr. Udall (Enclosure 1)):

> "Subparagraph 3(b)(2)(A) provides that the Secretary of Energy shall ensure the safe disposal of any radioactive waste described in the immediately preceding Section 3(b)(1) for which --

'(i) disposal is not provided under other Federal law in effect on the date of the enactment of the Low-level Radioactive Policy Amendments Act of 1985; and

(ii) the Secretary determines that no viable non-federal disposal capability exists.' [Emphasis added]

"This last provision may be inconsistent with the preceding paragraph [making the federal government responsible for disposal of wastes not a state responsibility.] It would permit the Secretary to take responsibility, not for all wastes that are not a state responsibility, but only those for which he determines that no "viable" non-federal disposal capability exists. ... The Secretary could find that a non-federal disposal capability is technically "viable" even without any state commitment to accept the waste for disposal."

Accordingly, the Commission recommended that the Committee delete the provision requiring DOE to make the "no viable non-federal capability" finding before accepting disposal responsibility for wastes not provided for under existing federal law. (See page 2 of Enclosure 2 of June 4, 1985 letter). The Commission continues to support the language in the original version of H.R. 1083 with this recommended revision.

The Commission also indicated in the June 4, 1985 letter to Chairman Udall that the bill "clearly identify the federal agency responsible for disposal"; and, accordingly we have substituted "Secretary" (of the Department of Energy) for "Federal Government" to specify which federal agency would be responsible for disposal of commercial above-Class-C waste.

2. STATUTORY AUTHORITY FOR DISPOSAL OF RADIOACTIVE WASTES NOT SUBJECT TO THE ATOMIC ENERGY ACT

In the letter to Chairman Udall, the Commission indicated that neither Section 3(a) on State disposal responsibilities nor 3(b) on federal responsibilities addressed the disposal of wastes currently outside the jurisdiction of the Atomic Energy Act. These wastes include naturally-occurring and accelerator-produced radioactive materials (NARM) that may be and have been disposed of at state-licensed facilities. Without clear statutory direction identifying the responsibility for disposing of these wastes, neither NRC, the States, nor waste generators will be able to assure that all NARM wastes will eventually be accepted for disposal. The Commission included as an enclosure to Chairman Udall proposed conforming language for NARM disposal authority for H.R. 1083. (See Enclosure 2. of June 4, 1985 letter.)

10/18/85

3. NRC-LICENSING AUTHORITY OVER DOE DISPOSAL OF COMMERCIAL LOW-LEVEL RADIOACTIVE WASTES

If Congress were to assign responsibility to the Federal government for disposal of all radioactive wastes greater than Class "C," it would probably raise the question of whether NRC should license the disposal of these wastes.

Several years ago, Section 12 of P. L. 95-601 directed the Commission to conduct a study of extending the Commission's licensing or regulatory authority to include categories of existing and future Federal radioactive waste storage and disposal activities not presently subject to NRC authority. In its response to Congress on September 7, 1979, the Commission unanimously recommended that it be given authority to regulate all new DOE facilities for disposal of non-defense low-level radioactive waste (See Enclosure 2). Consistent with this recommendation, the Commission continues to believe that commercial LLW waste which is the responsibility of the DOE should be licensed.

The proposed statutory language for Sec. 3(b) is presented below:

> "(4) The Nuclear Regulatory Commission shall have licensing and related regulatory authority pursuant to the Atomic Energy Act of 1954, as amended and in effect on January 1, 1985, over the Department of Energy for the disposal of radioactive wastes in Subparagraph 3(b)(1)(D) of this Act."

4. WASTE FUND FOR ABOVE "CLASS C" WASTE

The Commission in the June 4, 1985 letter to Chairman Udall recommended that milestones and financial assurances be provided to assure that responsible state and federal entities would begin accepting wastes by a specified deadline. The Commission believes that the 1992 deadline established in H.R. 1083 for new disposal capacity for states should also apply to the DOE.

Accordingly, a provision should be included for funding of DOE activities for disposal of commercial radioactive waste, as well as the acceptance date by which DOE would assume title.

The proposed new statutory language for Sec. 3(b) is presented below:

> "(3) Waste Fund for Subparagraph 3(b)(1)(D) Radioactive Wastes.
>
> (A) In the performance of his functions under Subparagraphs 3(b)(1)(D) and 3(b)(2), the Secretary is authorized to enter into contracts with any person who generates or

holds title to radioactive waste in Subparagraph 3(b)(1)(D). Such contracts shall provide for payment to the Secretary of fees sufficient to offset expenditures for the safe disposal of such wastes.

(B) Not later than two years after the date of enactment of this Act, the Secretary shall establish procedures for collection and payment of the fees required to ensure adequate funds for the disposal of these radioactive wastes.

(C) In return for payment of fees established by this subparagraph, the Secretary, beginning not later than January 31, 1992, will take title to and accept these radioactive wastes."

5. FLEXIBILITY FOR STATES OR COMPACTS TO DISPOSE OF "ABOVE CLASS C" WASTE

The Commission believes the states and compacts should not be precluded from accepting above class C waste in the event they elect to do so and the necessary regulatory approvals can be obtained. This provision would not reduce the need, in the Commission's view, to assign responsibility for disposal to the federal government. While the state and compacts may in the future elect to accept the wastes at a particular facility in order to enhance disposal economics, at present states and compacts are unwilling to accept disposal responsibility for such wastes.

The proposed statutory language for Sec. 3(a) is presented below:

> (4) Nothing in this Act shall be construed to prohibit a State or compact from accepting for disposal radioactive wastes described in Subparagraph 3(b)(1)(D)."

II. DELEGATION OF RCRA PERMIT AUTHORITY FOR MIXED WASTES

Section 15(c) directs the Administrator of the U.S. Environmental Protection Agency (EPA) to enter into an agreement with the NRC to delegate authority to NRC to issue permits for management of mixed wastes. To avoid continuing regulatory uncertainties, three clarifications of Congressional intent are needed concerning the role of the States in regulating mixed-wastes.

First, the bill does not clearly specify that the delegation of authority for mixed wastes from EPA to NRC would supersede any prior delegations of authority by EPA to States to issue permits as they would apply to NRC-licensed disposal facilities. Without such clarification, Section 15 may be construed to provide that NRC is to be delegated authority in addition to such States, and NRC-licensed facilities within these states would be subject to dual NRC-state agency regulation under RCRA.

Second, the bill is silent on the intent of Congress regarding redelegation of RCRA authority for mixed-waste regulation from NRC to Agreement State agencies through the EPA-NRC agreement under Section 15. It would be appropriate to clarify that Agreement State agencies authorized to regulate low-level waste disposal facilities under Section 274b. of the Atomic Energy Act would also be authorized to issue RCRA permits for mixed waste disposal at Agreement State-licensed disposal facilities pursuant to the EPA-NRC agreement under Section 15. It should also be understood that this authority would be carried out under NRC oversight pursuant to its agreement with EPA.

Lastly, no provision is made for mixed waste which the NRC, under Section 12 of the bill, identifies as below regulatory concern based solely on its low radiological hazard. Clarification should be made on this point to avoid the creation of an "orphan" hazardous waste category.

NRC Recommendations: We believe that the first and third of the above clarifications can be made through appropriate Committee Report language. The second, involving EPA delegation of RCRA authority to Agreement State agencies through NRC, may require an amendment to Section 15 of the House Interior Committee bill. Such language amending the end of Section 15(c) of H. R. 1083 is as follows:

> "Furthermore, the Nuclear Regulatory Commission may redelegate, as appropriate, the authority to issue permits to the Agreement States."

III. REGULATORY CONCERNS WITH COMPACTS NOT ADDRESSED BY H.R. 1083

Presented below are three regulatory concerns with compacts which have not been addressed in H.R. 1083:

1. PRESERVATION OF AGREEMENT STATE ROLE

Section 4(b)(4) of H.R. 1083 provides language preserving federal regulatory authority. The bill is silent on preservation of authority of NRC Agreement States under Section 274b. of the Atomic Energy Act.

NRC Recommendation: We believe that a new subsection should be added to Section 4 which would ensure the preservation of Agreement State regulatory authority. Such language is as follows:

> "Section 4(d) Agreement State authority.--Nothing in this Act shall diminish the regulatory authority of the Agreement States."

Note that the subsection (d) Congressional Review will have to be relabeled (e). Also, the definition of Agreement State as stated in Section 2(2)(A) should be sharpened. The reference to "section 274" should read "section 274b."

2. FEDERAL DISPOSAL FACILITIES

Section 4(b)(2) clarifies that disposal facilities operated exclusively for Federal Government low-level wastes are not subject to compact actions. In discussing the waste affected by this section, waste "produced" by the Federal Government is referenced. In certain special instances, federal facilities have accepted unique waste streams for disposal from NRC or Agreement State licensees. We believe this section may unintentionally restrict such disposal practices, which may be required to protect public health and safety.

NRC Recommendation: The NRC recommends that the word "produced" be replaced by the word "owned" to provide necessary flexibility to protect public health and safety.

3. MANAGEMENT VERSUS DISPOSAL

Regional programs provided for in various compacts go beyond "disposal" into most aspects of low-level radioactive waste management (e.g., storage, treatment and transportation). Included are import and export restrictions that go beyond "disposal" to encompass, for example, storage and treatment. The Low-Level Radioactive Waste Policy Act (Public Law 96-573) does not confer additional authority to the States with respect to generation, transportation, storage, treatment, or any other activity in the waste management system that does not constitute "disposal". Section 4 of H. R. 1083, which discusses the purpose for the formation of regional compacts, has language similar to Public Law 96-573, and therefore does not alter the intent of Congress, which is to form compacts for "disposal" only. Both Public Law 96-573 and H. R. 1083 acknowledge that the responsibilities of the States for the disposal of low-level radioactive waste can be most safely and efficiently managed on a regional basis. However, both are silent on the extent to which the States have interpreted their mandate to provide for "disposal."

NRC has discussed the issue of "management" versus "disposal" in previous Congressional testimony and in comments to the States on their compacts. The

States believe that they must have provisions in their compacts to limit the number of facilities of all kinds, determine their size, and assure their economic viability. Consequently, the States believe that they must manage for economic, institutional, and equity purposes the entire waste system to be fully responsive to Public Law 96-573, rather than only provide disposal capacity.

While the NRC recognizes a need on the part of the States to be able to exercise some control over the waste from generation to disposal in order to ensure the success of the States' disposal undertaking, the exercise of wide ranging management authority by the States poses the potential for serious conflict with NRC policies regarding short and long term storage and handling of waste by generators, among others. These management provisions could also place undue burden on interstate commerce.

NRC Recommendation: The NRC believes that the Congress should address this issue in a manner that recognizes the needs of the States to ensure the success of the States' performance of their legal obligation to provide disposal capacity, but, at the same time, reaffirms that Federal health and safety policies, however expressed, relating to the generation, transportation, handling, treatment, storage and disposal of waste take precedence over the economic, institutional, or equitable state management concerns. Additional language could be inserted into section 4(b) of H.R. 1083 for this purpose. Such language is as follows:

> "Section 4(b)(3) Effect of compacts on federal law.--Nothing contained in this Act or any compact may be construed to confer any new authority on any compact commission or State--
>
> "(A) to regulate for health and safety, the generation, handling, treatment, storage, packaging, transportation, and disposal of low-level radioactive waste in a manner inconsistent with the regulations of the Nuclear Regulatory Commission or the Department of Transportation, and the Agreement States;...
>
> "Section 4(b)(4) Federal authority.--Nothing contained in this Act or any compact may be construed to ~~limit-the-applicability-of-any-Federal-law or-to~~ diminish or otherwise impair the jurisdiction of any Federal agency, including the regulatory responsibilities of the Nuclear Regulatory Commission and the Department of Transportation.

10/18/85

Enclosures/References
1. Ltr to Chairman Udall fm
   Chairman Palladino, dtd
   June 4, 1985
2. Ltr to Speaker of the House
   fm Chairman Hendrie, dtd
   September 7, 1979

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

CHAIRMAN

EDO

June 4, 1985

The Honorable Morris K. Udall
Chairman, Subcommittee on Energy
and the Environment
Committee on Interior and Insular
Affairs
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

As you have requested, the Commission has evaluated H.R. 1083, the Low-Level Radioactive Waste Policy Amendments Act of 1985. I am pleased to provide the Committee with our written comments on the bill at this time. We believe the bill represents a strong beginning to resolving current uncertainties regarding full implementation of the Policy Act, but that certain refinements are needed to satisfy the four major features you identified in your floor statement introducing the bill. We hope our comments are useful, and pledge our continuing support for your efforts.

Sincerely,

Nunzio J. Palladino

Nunzio J. Palladino

Enclosures:
1. NRC General Comments on H.R. 1083
2. NRC Comments on Specific Sections of H.R. 1083
3. Proposed Conforming Language for Incorporating Non-Atomic Energy Act Radioactive Waste Disposal into H.R. 1083

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

June 4, 1985

The Honorable Strom Thurmond
Chairman, Committee on the Judiciary
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

In testimony before your committee on Low-Level Radioactive Waste Management Compacts, Mr. G. Wayne Kerr of our staff indicated that the Commission was evaluating H.R. 1083. This bill, introduced by Congressman Morris K. Udall, would amend the Low-Level Radioactive Waste Policy Act of 1980. I am pleased to provide the Committee with our written comments on the bill. We believe the bill represents a strong beginning to resolving current uncertainties regarding full implementation of the Policy Act, but that certain refinements are needed.

We hope these comments are useful, and pledge our continuing support for your committee's efforts addressing these uncertainties.

Sincerely,

Nunzio J Palladino

Nunzio J. Palladino

Enclosures:
1. NRC General Comments on
   H.R. 1083
2. NRC Comments on Specific
   Sections of H.R. 1083
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THE NUCLEAR REGULATORY COMMISSION'S GENERAL COMMENTS ON H.R. 1083 THE LOW-LEVEL RADIOACTIVE WASTE POLICY AMENDMENTS ACT

The Low-Level Radioactive Waste Policy Act of 1980 (Policy Act) assigns states the responsibility to provide for disposal of commercial and certain Federal low-level waste (LLW), and envisioned that states would be able to dispose of LLW generated within their borders individually or through regional compacts by 1986. Compacts consented to by Congress may restrict use of regional disposal sites after January 1, 1986, to disposal of LLW generated within the compact region. Due to lack of progress to date, no new LLW disposal facilities will be available by 1986. There is a distinct possibility that access to the operating disposal sites may be curtailed or subject to stringent volume restrictions if Congress does not consent to compacts containing those operating disposal sites. Such restrictions would compel licensees to pursue alternative waste management practices. Curtailment of the services that generate wastes may be unavoidable if individual licensees are unable to provide for adequate alternatives to disposal.

Congressman Morris Udall introduced the Low-Level Radioactive Waste Policy Amendments Act (H.R. 1083) in February 1985 to address concerns relating to implementation of the Policy Act.

In his floor statement of February 7, 1985, on H.R. 1083, Congressman Udall identified four important features of the legislative package:

"1. All interstate compacts submitted for Congressional ratification would be subject to the same Congressional agreements and legislative ratification language. Specific amendment or qualification of individual compacts are not contemplated in this approach, and would be discouraged."

"2. No substantive changes would be made to the content of the compact statutes ratified by the states and submitted for Congressional approval. The consent of Congress to the compacts would be based on our stated understanding, pursuant to our analysis of the compacts, that nothing in them confers new authority on the states or infringes on Federal authority."

"3. The LLRWPA [Low-Level Radioactive Waste Policy Act of 1980] made states responsible for disposal of low-level radioactive waste, and this legislative package defines specifically that material for which states are responsible. Other definitions of low-level waste for state or federal purposes may co-exist with this definition. Other radioactive wastes, with the exception of uranium mill tailings (responsibility for which is determined by the Uranium Mill Tailings Control Act), would be the responsibility of the Federal government."

"4. Before Congressional ratification of compacts became effective, one year from enactment of this package, states with operating disposal capacity would have to offer to enter into agreements, under their own existing compact authority, to accept out-of-region wastes for disposal, only in limited quantities and only until January 1, 1993. No requirement to accept out-of-region waste would be imposed by Congress upon a ratified compact group."

The four features identified by Congressman Udall are addressed below. Comments on specific sections of H.R. 1083 are contained in Enclosure 2.

1. All Interstate Compacts To Be Subject To Same Congressional Agreements and Legislative Consent Language

The Commission strongly supports this principle, and believes H.R. 1083 (and its companion bill for consent to individual compacts) would help implement it. To prevent inconsistency between the two bills, however, it may be useful to add a conforming change.

Section 4 of the compact consent bill provides that any authority under a compact to restrict access to regional disposal facilities would not become effective until all affected compact regions have complied with the requirements of Section 5 of the Policy Act (as added by H.R. 1083). Section 5 of that bill requires compact regions with operating disposal facilities to offer to enter into agreements to allocate available disposal capacity through January 1, 1993.

In conjunction with the compact consent language, H.R. 1083 effectively provides strong incentives to states with operating facilities to offer agreements, and provides incentives for states without access to such facilities to accept it. However, it may be more helpful to establish a specific requirement for continued access, subject to volume limitations, to currently operating facilities until 1993. If the present host states would agree to this approach, this could assure that continued access would not depend on the outcome of negotiations among the states after Congress has consented to the compacts with operating facilities.

ENCLOSURE 1

Establishing January 1, 1993, as the applicable effective date for all compacts to begin restricting the use of currently operating disposal facilities may be more likely to provide for an orderly and uniform implementation of access restrictions. Such a revision would establish that Congressional action, not a series of subsequent interstate agreements, determines when the restrictions are to become effective.

2. Nothing in Compacts to Confer New State Authority or Infringe on Federal Authority (Udall Feature 2)

H.R. 1083 contains provisions clarifying that the bill does not confer new authority on compact commissions or states in specified areas, and further clarifies that the bill may not be construed to diminish or otherwise impair federal agency jurisdiction. Broadly construed, the language contained in Sections 4(b)(3) and (4) addresses concerns expressed by the Commission in the past on these matters.

3. A Home for All Radioactive Wastes. (Udall Feature 3)

The Commission believes it is important for any legislation in this area to assure that all wastes have a state or federal "home" for disposal; that is, that governmental responsibilities for all categories of radioactive waste are clearly assigned. For any given waste stream, there should be no question as to whether disposal is the responsibility of the states (individually or through regional compacts) or the federal government. There should also be no question that both the federal government and states are to accept these wastes by a specified date.

The Nuclear Waste Policy Act of 1982 (NWPA) clearly specifies responsibilities among the several agencies within the Federal establishment for high-level wastes. The Commission believes this same clarity of expression would be desirable in H.R. 1083 for state and federal responsibilities.

State Responsibilities. The delineation of state responsibilities in the bill does not cover all wastes currently disposable under 10 CFR Part 61. It appears to exclude certain materials that would be Class A wastes, and all materials in concentrations exceeding the limits for Class C.[1] Section 3(a) of the Udall bill keys state responsibilities to Tables 1 and 2 of Section 61.55 of our rules. Section 61.55(a)(4) provides that if the waste does not contain any of the nuclides listed in either Table 1 or 2, it is Class A. To apply the waste classification system properly, it is not possible to rely solely upon the tables. As the bill is presently worded, it could be construed to relieve states of responsibility for the relatively low activity Class A wastes that do not contain nuclides listed in the tables.

---

[1] Under Section 61.7(b)(2) of Part 61, Class A includes "relatively innocuous" wastes that do not need to meet stability requirements. Under Section 61.7(b)(5), waste in concentrations above Class C limits "is generally unacceptable for near-surface disposal" [i.e., at 30-meter depths or less], although exceptions are provided for on a case-specific basis if it is demonstrated that Part 61 performance objectives would be met.

Section 3(a)(1) of H.R. 1083 limits state disposal responsibilities to wastes in concentrations that do not exceed the limits in the tables for Class C under Part 61. It is not clear, however, that the federal government is to be responsible for disposal of greater-than-Class C wastes.

In addition, NRC regulated transuranic waste, which is excluded from the definition of "low-level radioactive waste" under the Policy Act, also would be excluded from state responsibility under H.R. 1083. There is currently no disposal "home" for such waste, although H.R. 1083 would assign disposal responsibility to the federal government.

Federal Responsibilities. Section 3(b) of H.R. 1083 appears to contain inconsistent provisions concerning the extent of federal disposal responsibilities for wastes in concentrations exceeding Class C.

Read in isolation from qualifying language in Section 3(b)(2), Section 3(b)(1) of H.R. 1083 would assign the federal government responsibility for wastes exceeding Class C limits. It provides that the federal government shall be responsible for "ensuring the safe disposal of "... (D) all other radioactive waste material that is not a responsibility of the States under subsection (a) ...", [other than mill tailings]. Section 3(b)(2), however, indicates that the federal government would be responsible for only a subset of commercial LLW exceeding Class C limits.

Subparagraph 3(b)(2)(A) provides that the Secretary of Energy shall ensure the safe disposal of any radioactive waste described in the immediately preceding Section 3(b)(1) for which --

> "(i) disposal is not provided under other Federal law in effect on the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985; and
>
> (ii) the Secretary determines that no viable non-Federal disposal capability exists." [emphasis added]

This last provision may be inconsistent with the preceding paragraph. It would permit the Secretary to take responsibility, not for all wastes that are not a state responsibility, but only those for which he determines that no "viable" non-federal disposal capability exists. Criteria are not provided in the bill for a finding of "no viable capability." The Secretary could find that a non-federal disposal capability is technically "viable" even without any state commitment to accept the wastes for disposal.

The Commission recommends that the bill clearly identify the federal agency responsible for disposal and the date by which waste is to be accepted. If DOE is assigned responsibility, Congress should carefully address the relationship between the requirements for implementation of the Nuclear Waste Policy Act of 1982 (NWPA) and the requirements for implementing any new waste management responsibilities assigned to DOE under the bill. This would include consideration of National Environmental Policy Act (NEPA) requirements. The Commission is concerned that the high-level waste program not be unintentionally impacted.

Naturally-occurring or Accelerator-produced Radioactive Material (NARM) Wastes. Neither Section 3(a) on state responsibilities nor 3(b) on federal responsibilities specifies responsibility for the disposal of wastes that are not subject to the Atomic Energy Act. This includes naturally-occurring and accelerator-produced radioactive materials (NARM) that may be and have been disposed of at state-licensed facilities. Without clear statutory direction identifying the responsibility for disposing of these wastes, neither NRC, the Agreement States, nor waste generators will be able to assure that all NARM wastes will eventually be accepted for disposal. Enclosure 3 presents proposed conforming language for NARM disposal authority in H.R. 1083.

NRC Role Over Federal Government's Disposal Activities. If the federal government is to be assigned additional disposal responsibility, the question of regulatory responsibility for federal disposal of wastes from NRC-regulated activities should be resolved by this legislation. The bill does not resolve the question.

4. Provision of Limited Access to Existing Disposal Sites Until 1993. (Udall Feature 4)

Section 5 of H.R. 1083 sets forth a framework under which compacts with operating disposal facilities would offer to enter into agreements to provide limited access to their facilities for compact regions and states without disposal capacity. Access would be provided through January 1, 1993. The Commission recommends a mechanism providing for states and regions to accept these wastes beginning in 1993.

Means for Allocating Limited Disposal Capacity. In his floor statement introducing the bill, Congressman Udall indicated that the appropriate means of distributing the burden of reducing the waste stream would be a major issue to be resolved in the legislative process. The bill does not specify means for allocating the limited disposal capacity that would be available.

Section 5(a) provides that disposal facility access agreements would allocate capacity to compact regions and states, rather than to waste generators. While the bill is silent on allocation mechanics, the language in Section 5(a) may be interpreted to authorize compact regions and states to control waste generation. Establishment of disposal site access agreements by the states and compacts may, on a case-specific basis, be inconsistent with Section 4(b)(4)of the bill, which provides that nothing in the bill or any compact may be construed to "limit the applicability of any Federal law or otherwise impair the jurisdiction of any Federal agency, including the regulatory responsibilities of the [NRC]." For example, waste generators may be directed to store wastes or cease waste generation without adequate provision for protection of public health and safety. Also, if agreements under Section 5(a) of the bill resulted in generator restrictions, a considerable regulatory burden could be placed on the NRC in responding to individual licensee problems.

The Commission recommends that Congress specifically address whether or not it intends as national policy that states have authority to impose restrictions on waste generators that would involve national-level public health and welfare and economic considerations, and may disrupt essential services.

Requirements for Good Faith Negotiations by States. Under Section 5(a), compacts with operating facilities are required only to offer to enter into access agreements. The bill does not require a compact region with disposal capacity to enter into an agreement -- or even to continue negotiating -- with non-sited compact regions or states after the nine-month period during which the offer is to remain available. It is uncertain that compact regions with disposal capacity would have sufficient incentive to conclude agreements. Interregional discussions regarding post-1986 disposal site access have been underway among the states for over a year without resolution to date. If mutually acceptable agreements cannot be reached, licensees in certain states and compact regions without disposal sites could, under Section 5(a), lose access to disposal facilities as early as late 1986. (This assumes passage of the bill in 1985.)

Milestones and Financial Assurances. To assure that existing disposal sites (and storage practices) would not be relied upon indefinitely for lack of progress in states and regions without sites, and to ensure that responsible state and federal entities will begin accepting wastes by a specified deadline, legislatively mandated milestones appear warranted. There should also be a clear means of providing the requisite degree of financial assurance that funds will be available to carry out these responsibilities.

The NWPA provided for a contractual relationship under which DOE is to accept high-level waste by an agreed-upon date, and the generators or owners of the wastes are to pay a fee to cover waste management costs. A similar approach may be worth considering for other radioactive wastes.

Whatever date is agreed upon as a final deadline for acceptance of out-of-region waste at operating sites, the Commission believes identification of intermediate milestones could help assure that the final date is met. These milestones might include identification of the states that will host new facilities, identification of candidate disposal sites, and filing of disposal facility license applications in sufficient advance of the deadline.

To assure that deadline pressures do not prevent a full and fair consideration of licensing issues at a chosen site, it may also be useful to consider requirements for alternatives in the form of state or compact storage facilities or back-up candidate disposal sites if the initially-selected site is found unsuitable.

There is a basis in radiological health and safety for a firm deadline for the execution of both state and federal disposal responsibilities. For many generators of LLW, the only feasible alternative to disposal short of curtailing waste generation is storage. Long-term storage would likely result in additional occupational radiation exposures, particularly if waste repackaging is needed to meet transportation or disposal requirements. Although some long-term storage is probably unavoidable under current circumstances, this practice should not continue indefinitely. A firm deadline for the acceptance of the wastes for disposal by both the states and the federal government is essential to provide assurance that long-term storage does not become de facto disposal for lack of an alternative.

5. Regulatory Uncertainties Not Addressed by the Bill

The bill does not address the uncertainties posed to NRC-regulated activities by federal environmental laws and regulations, such as the Resource Conservation and Recovery Act (RCRA) and the Environmental Protection Agency (EPA) standards and regulations. In addition to the NEPA-related issues discussed above, regulatory uncertainties exist with respect to hazardous non-radiological waste constituents, naturally-occurring and accelerator-produced radioactive material (NARM) wastes, and radiation release standards. These uncertainties may contribute to delays in establishing new waste disposal facilities. NRC is monitoring EPA efforts to develop radiation release standards applicable to LLW disposal. The Commission is also evaluating management of NRC-regulated non-radiological waste constituents, and is keeping EPA staff informed of our progress. However, it cannot be assured that NRC/EPA staff efforts will satisfactorily resolve the uncertainties. This legislation could provide an opportunity to clarify these issues.

THE NUCLEAR REGULATORY COMMISSION'S COMMENTS ON SPECIFIC SECTIONS OF H.R. 1083

Sec. 2(1) The definition of Agreement State should be identical to the definition in 10 CFR Part 150.3(b) to ensure consistency. Section 2(1) should be replaced as follows:

"(1) Agreement State means any state with which the Commission or the Atomic Energy Commission has entered into an effective agreement under subsection 274 b of the Act."

Sec. 2(2) The definition of "atomic energy defense activity" varies from the Low-level Radioactive Waste Policy Act with the following changes and implications.

(A) Waste from naval propulsion operations is omitted, and would thus be eligible for disposal in licensed facilities.

(B) Waste from inertial confinement fusion activities is now limited to that associated with weapons.

(E) "defense waste" becomes," defense nuclear waste." It is not clear what the implication is for non-nuclear defense waste. It may mean that states with Resource Recovery and Conservation Act (RCRA) permitting authority may be able to regulate defense non-nuclear waste intermixed with nuclear waste. The inclusion of the phrase "materials byproducts management" may be a reference to DOE's recent proposal to interpret the term "by-product material" to include nonradioactive material in a primary byproduct waste stream from processing or producing special nuclear materials. The legislative record should clarify the intent of this paragraph as it may impact the applicability of the RCRA to NRC-regulated activities.

Sec. 2(4) "commercial nuclear power reactor" should also reference reactors licensed under §104b of the Atomic Energy Act.

Sec. 2(8) The definition of "disposal" is incomplete and vague. It should be clarified to denote that with disposal there is no intent to remove the wastes following emplacement.

ENCLOSURE 2

Sec. 2(12)	The definition of low-level radioactive waste in the Policy Act has caused confusion and contributed to the state's reluctance to accept radioactive wastes classified as "Above Class C" under 10 CFR Part 61.[1] Furthermore, in paragraph 12 use of the word "byproduct" should be followed with "as defined in Section 11(e)(2) of the Atomic Energy Act of 1954," to limit the scope to only uranium and thorium tailings and waste.
Sec. 2(16)	The definition of transuranic waste is incomplete. It should read " . . . greater that the limits established by rule by the Nuclear Regulatory Commission for disposal of transuranic waste at a disposal facility. . . "
Sec. 3(a)(1)	Reference to Tables 1 and 2 alone is inadequate. It should also reference other provisions of 10 CFR 61.55 to assure that states remain responsible for all licensed Class A and B wastes.
Sec. 3(b)(2)(A)	This section is a general authorization for DOE to dispose of all radioactive waste not the responsibility of the States, and not already a Federal responsibility under some other law. This provision would overcome the legal objections that have been expressed by DOE to accepting certain existing wastes, particularly NRC-regulated transuranic waste. Paragraph (ii) requires a finding of fact that no "viable" non-federal disposal capability exists to accept such wastes. Deletion of Paragraph (A)(ii) is necessary if the Commission is to be assured that all wastes will have a home.
Sec. 4	Subsection 4(b)(3)(A) through (C) and (E) should not be

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[1] As discussed in Enclosure 1, the Commission believes it would be useful to provide conforming language for NARM waste disposal in H.R. 1083.

included in subsection (b) which is aimed at Federal activities, these paragraphs (A, B, C and E) affect not only Federal, but private activities. To clarify their general applicability. Subsections 4(b)(3) and 4(b)(4) should be combined and redesignated as 4(e).

Subsection 4(b)(3)(E) should be clarified by inserting the phrase, "of the Federal Government," after the word indemnification.

Subsection 4(c) must be read together with Section 5 and Congressman Udall's proposed compact consent language since the latter would establish "the applicable effective date established in [such] law."

Sec. 4(b)(4) Add Agreement States authority under Section 274 b of the Atomic Energy Act of 1954, as amended, to ". . . the Nuclear Regulatory Commission and the Department of Transportation."

Sec. 5 This provision presents a difficult negotiating situation. By its terms the offering and negotiating parties are compact Commissions and States. But the payers of the surcharges will be waste generators, including the Federal Government (see Section 4(b)(1)(B)). Nor does the legislation indicate who the beneficiary of the surcharge will be--a compact Commission, state, or disposal site operator. The net effect may very well be to penalize waste generators, and not the political institutions that need to be pressed to act.

Sec.6 This provision, "Assurance of Financial Responsibility," is in part redundant with Section 151 of the Nuclear Waste Policy Act of 1982, though it adds several new requirements: (1) that there be financial assurance or bonding for "safe and environmentally sound" operation of the disposal facility; and (2) that there be financial assurance for "corrective action prior to the expected time of license termination due to economic or health and safety reasons." Both of these requirements parallel, to an extent, NRC staff initiatives regarding financial assurance for clean up of offsite releases. However, the vague language for both could imply that NRC and Agreement States are to become involved in reviewing the financing and cash flow requirements of an operating disposal facility to ensure that adequate operational financial assurance is provided. NRC staff has not fully evaluated potential impacts or the desirability of legislatively mandated financial assurance requirements for unanticipated "corrective action." However, such requirements would carry significant policy and resource implications.

PROPOSED CONFORMING LANGUAGE FOR INCORPORATING NON-ATOMIC ENERGY ACT RADIOACTIVE WASTE DISPOSAL RESPONSIBILTIES INTO H.R. 1083

Definitions

Sec. 2(12) "The term 'low-level radioactive waste' means radioactive material, whether or not subject to the provisions of the Atomic Energy Act of 1954, as amended, that--"

State Responsibilities for Disposal

Sec. 3(a)(1) "(C) contains concentrations of radionuclides which are not source, byproduct or special nuclear material as defined in Title II of the Atomic Energy Act of 1954, as amended, that the Commission by rule determines has radioactivity levels no greater than low-level radioactive waste classified as 'Class C' under 10 CFR Part 61.55."

Federal Responsibilities for Disposal

Sec. 3(b)(1) "(D) all other radioactive waste material, whether or not subject to the provisions of the Atomic Energy Act of 1954, as amended, not a responsibility of the States under subsection (a), . . ."

ENCLOSURE 3

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

September 7, 1979

The Honorable Thomas P. O'Neill
The Speaker of the U.S. House
 of Representatives
Washington, D.C. 20510

Dear Mr. Speaker:

Section 12 of P. L. 95-601 authorized and directed the Commission to conduct a study of extending the Commission's licensing or regulatory authority to include categories of existing and future Federal radioactive waste storage and disposal activities not presently subjected to such authority. The enclosed report, entitled "Regulation of Federal Radioactive Waste Activities," contains the results of that study. It has previously been provided in draft form to the House and Senate subcommittees having oversight responsibilities for the NRC.

The report contains two recommendations for extending the Commission's regulatory authority:

Recommendation 1: NRC licensing authority should be extended to cover all new DOE facilities for disposal of transuranic (TRU) waste and non-defense low-level waste.

Recommendation 2: A pilot program, focused on a few specific DOE waste management activities, should be established to test the feasibility of extending NRC regulatory authority on a consultative basis to DOE waste management activities not now covered by NRC's licensing authority or its extension as recommended in Recommendation 1.

The Commission endorses both Recommendations. The Commissioners are unanimous in their support of Recommendation 1, which is equivalent to the recommendation (Option 2) of the Interagency Review Group on Nuclear Waste Management. Regarding Recommendation 2, the Commission believes that there can be a viable *pilot* program without the inclusion of defense related waste management activities and that they should not be included. Commissioners Gilinsky and Bradford do not support Recommendation 2 as proposed. In their view, the issue is whether the DOE's high-level waste tanks and waste solidification facilities should be regulated by the NRC. They regard as pointless a pilot program which fails to include these facilities. The reasons for these differing views are given in the enclosed document, "Differing Commissioner Views Concerning the Pilot Program."

My fellow Commissioners and I would be happy to answer any questions related to the enclosed report or our views with respect to its recommendations.

Sincerely,

Joseph M. Hendrie
Chairman

Enclosures:
As stated

10/18/85

PROPOSED NRC AMENDMENTS
TO THE
LOW-LEVEL RADIOACTIVE WASTE POLICY AMENDMENTS ACT OF 1985

[NOTE: ALL LINE-IN LINE-OUT CHANGES REFER TO THE H.R. 1083 VERSION AS REPORTED BY THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS ON JULY 30, 1985]

I. STATUTORY AUTHORITY OVER NARM WASTE

Sec. 2(13) LOW-LEVEL RADIOACTIVE WASTE.--The term 'low-level radioactive waste' means radioactive material, whether or not subject to the provisions of the Atomic Energy Act of 1954, as amended, that--"

II. STATE RESPONSIBILITIES

"Sec. 3. (a) STATE RESPONSIBILITIES.--Each State shall be responsible for providing, either by itself or in cooperation with other States, for the disposal of--

"(1) low-level radioactive waste generated within the State (other than by the Federal Government) that consists of or contains class A, B, or C, radioactive waste as defined by section 61.55 of title 10, Code of Federal Regulations, as in effect on December 27, 1982 or contains concentrations of radionuclides which are not source, byproduct or special nuclear material as defined in Section 11 of the Atomic Energy Act of 1954, as amended and in effect on January 1, 1985, that the Commission by rule determines has radioactivity levels no greater than low-level radioactive waste classified as 'Class C' under 10 CFR Part 61.55.

...

"(4) Nothing in this Act shall be construed to prohibit a State or compact from accepting for disposal radioactive wastes described in Subparagraph 3(b)(1)(D)."

III. FEDERAL RESPONSIBILITIES

10/18/85

[NOTE: SEC. 3(b) OF HR 1883 AS REPORTED FROM THE HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS SHOULD BE DELETED AND LANGUAGE FOR SEC. 3(b) OF HR 1083 AS ORIGINALLY INTRODUCED BY CONGRESSMAN UDALL ON FEBRUARY 7, 1985 SHOULD BE SUBSTITUTED WITH THE FOLLOWING LINE-IN LINE-OUT CHANGES.]

(b) FEDERAL RESPONSIBILITIES--(1) The ~~Federal Government~~ Secretary shall be responsible for ensuring the safe disposal of--

(A) high-level radioactive waste and spent nuclear fuel, in accordance with the provisions of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101 et seq.);

(B) low-level radioactive waste generated as a result of any ~~atomic energy defense activity or Federal research development~~ activity of the Secretary;

(C) low-level radioactive waste generated as a result of any research, development, testing, or production of any atomic weapon; and

(D) all other radioactive waste material whether or not subject to the provisions of the Atomic Energy Act of 1954, as amended, that is not a responsibility of the States under subsection (a), other than byproduct material defined in section 11e. (2) of the Atomic Energy Act of 1954 (42 U.S.C. 2104(e) (2)), as such section is in effect on January 1, 1985.

"(2) (A) The Secretary of Energy shall take such actions as may be necessary to ensure the safe disposal of any radioactive waste described in paragraph (1) for which~~--~~

"~~(i)~~ disposal is not provided under other Federal law in effect on the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985.~~; and~~

~~"(ii) the Secretary determines that no viable non-Federal disposal capability exists.~~

"(B) Not later than the expiration of the 12-month period following the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985, the Secretary shall submit to the Congress a comprehensive report setting forth the plan of the Secretary for carrying out the provisions of subparagraph (A). Such report shall include--

"(i) an identification of the radioactive waste for which the ~~Federal Government~~ Secretary has responsibility under subparagraph (A);

~~"(ii) an identification of whether disposal for such radioactive waste is provided under other Federal law in effect on the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985;~~

~~"(iii) an identification of whether viable non-Federal disposal capability exists for such radioactive waste;~~

"~~(iv)~~ (ii) an identification of the radioactive waste for which the Secretary is required to ensure the safe disposal of such radioactive waste;

"~~(v)~~ (iii) a description of the actions required to ensure the safe disposal of such radioactive waste;

"~~(vi)~~ (iv) the proposed schedule of the Secretary for taking such actions;

"~~(vii)~~ (v) a description of the projected costs of taking such actions;

"~~(viii)~~ (vi) the proposals of the Secretary for obtaining the funds necessary to take such actions; and

"~~(ix)~~ (vii) any recommendations of the Secretary for legislation to assist the Secretary in carrying out the provisions of subparagraph (A).

1. PRESERVATION OF AGREEMENT STATE ROLE

A new subparagraph should be added to Sec. 4 of the bill as follows:

"(d) Agreement State authority.--Nothing in this Act shall diminish the regulatory authority of the Agreement States."

"~~(d)~~(e) CONGRESSIONAL REVIEW.-- ...

In addition the definition of Agreement State as stated in Section 2(2)(A) should be sharpened. The reference to "section 274" should read "section 274b."

V. FEDERAL DISPOSAL FACILITIES

Section 4(b)(2) clarifies that disposal facilities operated exclusively for Federal Government low-level wastes are not subject to compact actions. In discussing the waste affected by this section, waste "produced" by the Federal Government is referenced. In certain special instances, federal facilities have accepted unique waste streams for disposal from NRC or Agreement State licensees. We believe this section may unintentionally restrict such disposal practices, which may be required to protect public health and safety.

The NRC recommends that the word "produced" be replaced by the word "owned" to provide necessary flexibility to protect public health and safety.

VI. MANAGEMENT VERSUS DISPOSAL

Sec. 4(b)(3) Effect of compacts on federal law.--Nothing contained in this Act or any compact may be construed to confer any new authority on any compact commission or State--

(A) to regulate for health and safety, the generation, handling, treatment, storage, packaging, transportation, and disposal of low-level radioactive waste in a manner inconsistent with the regulations of the Nuclear Regulatory Commission or the Department of Transportation, and the Agreement States;...

Sec. 4(b)(4) Federal authority.--nothing in this Act or any compact may be construed to ~~limit-the-applicability-of-any-Federal-law-or-to~~ diminish or otherwise impair the jurisdiction of any Federal agency, including the regulatory responsibilities of the Nuclear Regulatory Commission and the Department of Transportation.

VII. DELEGATION OF RCRA PERMIT AUTHORITY FOR MIXED WASTES

Sec. 15 MIXED WASTES.

(c) Delegation of Authority.--Not later than 180 days after complying with subsection (a), the Administrator shall enter into an agreement with the Nuclear Regulatory Commission under which the Administrator shall delegate the authority to ensure compliance with the interim status requirements of section 3005(e) of the Solid Waste Disposal Act (42 U.S.C. 6925(e), and to issue permits under section 3005 of the Solid Waste Disposal Act (42 U.S.C. 6925) to the Nuclear Regulatory Commission for the disposal of waste identified under subsection (a). Such agreement shall provide for the exercise of such authority in accordance with part 61 of title 10, Code of Federal Regulations, and compatible with the regulations of hazardous waste under subtitle C of the Solid Waste Disposal Act (42 U.S.C. 6921-6339a). Furthermore, the Nuclear Regulatory Commission may redelegate, as appropriate, the authority to issue permits to an Agreement State.

(NOTE: The legislative history should also indicate that EPA or states authorized by EPA to carry out the requirements of subtitle C of the Solid Waste Disposal Act would be responsible for ensuring compliance with the interim status requirements of section 3005(e) of such Act until such time that the Administrator of EPA delegates such authority to the NRC under Sec. 15(c) of the bill.)

DOE COMMENTS ON EPA AND NRC TESTIMONY

DOE comments on the statements submitted by the Nuclear Regulatory Commission (NRC) and the Environmental Protection Agency (EPA) follow:

Statement of William J. Dircks, Executive Director for Operations, U.S. Nuclear Regulatory Commission

We agree with the NRC concerning the need for preserving existing Federal regulations and procedures as well as a nationally accepted definition of low-level radioactive waste. We also agree with three of the four principal issues raised by the NRC ("...areas of particular concern to the Commission"). Specifically, the Department:

- Supports the regulation of the disposal of mixed wastes by the NRC or through agreement State provisions with oversight by the NRC;
- Supports issuing guidance rather than rulemaking as recommended by the NRC; and,
- Supports the NRC proposal that a State that misses a milestone should certify to waste generators and owners and the "sited" States that the State will manage its own waste--that is, provide disposal capacity in accordance with the intent of the Low-Level Radioactive Waste Policy Act.

Under "A Home For All Radioactive Waste," the NRC opposes the provision in S. 1578 and S. 1517, as amended, that would allow the Secretary of Energy to prepare a report that would evaluate the wastes that would not be disposed ~~under any Federal law~~. Specifically, the NRC believes that low-level radioactive waste that is above Class C should be assigned either to the States or to the Federal Government.

DOE agrees that above Class C waste and other wastes that are now or would be "orphaned" under the Low-Level Radioactive Waste Amendments Act should be assigned a "home." However, we believe it appropriate that the full range of Federal and non-Federal options be considered before making such an assignment. This approach would ensure a more complete and manageable resolution of the issue. In addition, we believe this approach could resolve several uncertainties that would arise out of NRC's proposed assignment of responsibility for orphan wastes to DOE. Since it is inappropriate to add non-DOE waste to disposal sites dedicated to wastes from DOE's national security and other mission-oriented activities, such uncertainties and issues would include the need for new authorities, capital funding requirements, site selection(s), and disposal charges. Additionally, assigning this waste to DOE would not ease the institutional difficulties for finding a home for these wastes. Therefore, DOE recommends--consistent with both Senate bills--that it be allowed to continue to have the opportunity to identify the types of wastes affected and to recommend various options for the safe and environmentally acceptable disposal of these wastes.

Statement by Sheldon Meyers, Acting Director, Office of Radiation Programs, U.S. Environmental Protection Agency

EPA discussed the reason for a delay in promulgating a final standard for low-level radioactive waste. The Department urges the issuance of the final low-level waste standard no later than early 1987, as referenced in Mr. Meyers' testimony. The Department agrees with EPA that the standard should include naturally-occurring and accelerator-produced radioactive materials (NARM) as well as define criteria for wastes that are "below regulatory concern" (BRC). If other means for disposing of BRC wastes can be determined, a significant amount of waste currently being disposed as low-level radioactive waste can be reduced in volume and valuable space at disposal facilities can be preserved.

DOE RECOMMENDATIONS FOR STRENGTHENING PROPOSED MILESTONES IN S. 1578 AND S. 1517, AS MODIFIED BY AMENDMENT 583

DOE is concerned that if a State or compact region does not meet the milestones included in the proposed legislation, the penalties accrue primarily to the waste generators within that State or the compact region, either by loss of access to a disposal site, increased disposal fees, or both. Therefore, DOE believes that the milestones contained in S. 1578 and S. 1517, as amended, could be strengthened to assure continuing progress toward the development of new disposal capacity.

As presently required in the proposed legislation, compact regions would have to either select a host State for a disposal facility or select a developer for such a facility by January 1, 1988. Both compact regions and States must also develop a siting plan by January 1, 1988. By January 1, 1990, a license application must be submitted to the NRC.

DOE believes it would require at least 2 years to properly characterize a site and prepare a license application. Therefore, DOE recommends that the 1988 milestone be revised to require that the site be selected by January 1, 1988. If a State has not identified its site (either within a compact region or individually) by January 1, 1988, it should provide a plan as to how it will provide for its waste by 1990. The State should take title to the waste generated within its borders by 1990 if it has not met the 1990 milestone in the bill, e.g., the submittal of a license application to the NRC.

These recommendations allow the States and compact regions an additional 2 years beyond the time required in the Low-Level Radioactive Waste Policy Act to select a disposal site or to determine some other course of action. If a site cannot be selected by 1988, then an additional 2 years is provided to pursue the alternative course; however, the State must then accept title to the waste for not meeting required milestones. Those States and regions that can meet the milestones may have until December 31, 1992 to develop their facilities.

States or compact regions that have not met their milestones could also be required to pay the penalty surcharges included in the bill, rather than have that obligation met by the waste generators.

Senator SIMPSON. I think that's an excellent suggestion. Let me just say one thing further. I was a little pungent in my remarks about the process of EPA and NRC, and I want to say that there has been perceptively, since you came on line, Mr. Meyers, a new flexibility there, a new sense of direction and purpose, and I appreciate that.

When I first came here in 1979, it had deteriorated badly. I'm not talking about Democratic or Republican administrations. There is more openness, more attempts at cooperation now, and I appreciate that.

And Bill Dircks, it is certainly different. We have much to do, and we must be about the serious issues of high- and low-level nuclear waste. I thank you all very much. I appreciate your being here.

The next panel consists of Mr. Thomas Blackburn, director of special programs, Texas Low-Level Radioactive Waste Disposal Authority of Austin, TX; Ms. Judy Kany, chairman of the Advisory Committee on Radioactive Waste of Waterville, ME.

It's a pleasure to have you both here. In the order there of the agenda, Mr. Blackburn then, please.

STATEMENT OF THOMAS W. BLACKBURN III, TEXAS LOW-LEVEL RADIOACTIVE WASTE DISPOSAL AUTHORITY, AUSTIN, TX

Mr. BLACKBURN. Thank you, Mr. Chairman and members of the subcommittee. I'd like to thank you for the opportunity to be here today to testify regarding the proposed amendments to the Low-Level Waste Policy Act of 1980.

In response to the Waste Policy Act, the State of Texas created the Texas Low-Level Radioactive Waste Disposal Authority with a mandate to site, construct, and operate a radioactive waste disposal facility in Texas for the disposal of waste produced in Texas. The authority has been operational for 3 years.

The legislation before you makes several rather crucial changes to the Low-Level Radioactive Waste Policy Act of 1980, including extending the January 1, 1986, cutoff date, volume reduction and allocation requirements among generators, a surcharge structure, and continued site access tied to meeting specific milestones.

We generally support the policies enumerated in Senate bill 1578. In the interests of time, I would like to confine my oral comments to only one topic. The act established a deadline of January 1, 1986, as the operating date for new radioactive waste disposal facilities in the country. S. 1578 moves that deadline to December 31, 1992, and establishes specific milestones and cutoff dates for entry to current disposal sites if milestones are missed.

Any extension of the 1986 cutoff date should be set so that States and compacts will feel pressured to get their sites in place.

In Texas, the political leadership was willing to move ahead aggressively when they felt that the disposal capacity would be cut off after January 1, 1986. In February of this year, after a two-site screening study, the staff of the authority proposed the siting of a low-level radioactive waste disposal facility in south Texas. However, when it became known that the 1986 date was expected to be extended and that other States were not moving ahead as quickly as Texas was, the political leadership within the State reacted in a manner resulting in a 3- to 4-year delay in the opening of the Texas facility.

In February our schedule called for a Texas disposal facility to be operational by late 1988. Today, that date is early 1992. We cannot emphasize how important it is to set realistic milestone dates that will encourage people to act on this matter. We concur with the milestones proposed in S. 1578 and feel that continued site access should be the incentive to meet those milestones.

If a milestone is missed, access should be denied until that milestone has been met.

My prepared testimony addresses several other topics, and I'd be happy to answer any questions you may have at this time.

Thank you.

[The prepared statement of Mr. Blackburn follows:]

TESTIMONY
of
Thomas W. Blackburn III
Texas Low-Level Radioactive Waste Disposal Authority
before the
United States Senate
Committee on Energy & Natural Resources
Committee on the Environment & Public Works
Washington, D.C.
October 8, 1985

Mr. Chairman, members of the Subcommittee, thank you for inviting me here today to testify on the matter of low-level radioactive waste disposal legislation and the proposed Low-Level Radioactive Waste Policy Act Amendments of 1985.

In response to the Low-Level Radioactive Waste Policy Act of 1980, the State of Texas created the Texas Low-Level Radioactive Waste Disposal Authority with a mandate to site, construct, and operate a radioactive waste disposal facility in Texas for waste produced in Texas. The Authority has been aggressively pursuing this mandate, having completed a statewide siting survey, a thorough analysis of radioactive waste volumes produced in the state, numerous studies related to local government and public participation in the siting process, and technical analyses of low-level radioactive waste disposal technologies.

In February of this year, after an extensive statewide screening study, the staff of the Authority proposed the siting of a low-level radioactive waste disposal facility near the community of Tilden in McMullen County, Texas. When considerable pressure was brought to bear on local and state government officials, the Texas Legislature enacted amendments to the Authority's enabling statute and redirected us to give preference to siting on state-owned land, much of which is located in more remote areas of the state. The net effect of these new amendments is that the proposed operating date for the site has been pushed from 1988 to 1991.

The legislation before you makes several rather crucial changes to the Low-Level Radioactive Waste Policy Act of 1980, including extending the January 1, 1986 cutoff date to December 31, 1992, volume reduction and allocation requirements among generators, and a surcharge structure and milestones that should be established to trigger such surcharges. We generally support the policies enumerated in Senator Thurmond's bill, S. 1578. My testimony will touch on several topics from the viewpoint of a single state going it alone in the construction of a waste disposal facility under the policy set out in the Low-Level Radioactive Waste Policy Act of 1980.

The Act established a deadline of January 1, 1986 as the operating date for new waste disposal facilities. S. 1578 moves that deadline to December 31, 1992 and establishes specific milestones and cutoff dates for entry to current disposal sites if the milestones are missed. Any extension of the 1986 cutoff date should be set so that states and compacts will feel pressured to get their sites in place. In Texas, the political leadership was willing to move ahead very aggressively when they felt disposal capacity would be cut off after January 1, 1986. When it became known that the date was expected to be extended, and that other states were not moving ahead as quickly as Texas, they reacted in a manner resulting in Texas slowing down in the development of a facility to match the pace of the rest of the nation. For example, a recently enacted state law precludes issuance of a license for construction of a site prior to July 6, 1987. This date was set to allow our agency to move more in concert with the relaxed federal program but still keep up the pace. We cannot emphasize how important it is to set milestone dates that will force people to take action on this matter, rather than continue the "wait and see" attitude which has prevailed since the enactment of the Low-Level Radioactive Waste Policy Act of 1980. We concur with the milestones proposed in S. 1578. Site access should be the incentive to meet these milestones. If a milestone is missed, access should be denied until the milestone has been met.

With respect to volume reduction, we feel strongly that much more can be done to reduce the amount of radioactive waste which is produced across the country. Incentives can be onerous, such as requirements for stockpiling the waste because there is no place to send it, or more positive, such as economic savings from reduced waste disposal volumes. There are also valid ecological reasons for volume reduction, such as conservation of space in burial facilities and improvements in waste form. Before generators will commit to immediate volume reductions, and before they will feel they are gaining anything by volume reduction, some regulatory and procedural changes will probably need to be instituted.

First, under existing law, some regulatory changes can be made to promote volume reduction. Simple matters such as the deregulation of small quantities of short-lived and non-toxic radioisotopes would substantially reduce volumes. This would include changes to Nuclear Regulatory Commission regulations, allowing generators to dispose of small quantities of radioisotopes with a half-life of 100 days or less in local landfills. This would eliminate the transportation and associated costs of shipping these relatively non-radiotoxic materials across the country to be buried at Hanford or Barnwell. If such a rule were instituted in Texas, approximately 50 to 80 percent of all medically related non-reactor waste could be safely disposed of within the state.

Another simple regulatory change which would promote volume reduction would be for the Environmental Protection Agency to move rapidly to define de minimis levels of radioactive material. Such a rule change would contribute to reducing the amount of waste currently shipped from medical facilities, some industrial facilities, and possibly, nuclear power plants.

An additional regulatory change that could reduce radioactive waste volumes involves a simplification of the regulations for the construction of waste incinerators. Although it is commonly accepted that incineration technology is an appropriate volume reduction method that can reduce volumes significantly while protecting air quality, the cumbersome licensing process for building and operating these incinerators is such that many people are not willing to commit to this technology.

Second, generators must be given economic incentive to employ volume reduction. Otherwise, they will simply throw all their garbage in a 55-gallon barrel and ship it out of the state. We have determined in a recent study that many waste generators do not segregate wastes to reduce volume simply because it is more cost effective to put the material in a drum and ship it to a waste broker. If short-lived, non-toxic radioisotopes could be disposed of locally, more generators would be willing to segregate wastes and ship the longer-lived material to a waste disposal site, while disposing of the short-lived material locally at a substantial cost savings.

Third, we believe that volume reduction could be further promoted by a better definition of low-level radioactive waste. We do not believe that the current definition set out in the regulations or the definition proposed by the Low-Level Radioactive Waste Policy Act Amendments of 1985 is adequate to effectively define low-level radioactive waste. Texas has its own definition. The federal regulations have another. Each compact has its own definition, and the proposed amendments contain yet another. This uncertainty can cause problems when the states get down to siting. One of the most often asked questions we receive from the public is "What is low-level radioactive waste?" The answer is confusing.

We propose that the definition used in S. 1578 be used as an interim standard until the Nuclear Regulatory Commission can conduct rulemaking proceedings to more accurately define low-level radioactive waste. Such a definition might break the waste down into further categories, such as low-level radioactive waste, intermediate-level waste, transuranic waste, and high-level waste. A definition of this sort is not novel; it is currently used successfully in many European countries. We believe that the definition of radioactive waste should proceed in this manner, because the Nuclear Regulatory Commission has the technical expertise available to study the issue carefully and set the standards out in a scientific manner. A standard definition would be of immeasurable benefit to everyone. We could amend our state statutes to be compatible with a uniform standard if one were promulgated.

Fourth, and last, we believe that amendments to the Low-Level Radioactive Waste Policy Act of 1980 should encourage the development of volume reduction technology as a management tool on a regional basis, much as it encourages the construction of hazardous waste management and disposal facilities on a regional basis. Texas has started looking closely at waste management technologies as an integral element of its waste disposal objective. While we concede that volume reduction will not eliminate the need for disposal sites, it will provide more options for waste handling.

Although waste volume reduction could be mandated, a more appropriate vehicle for establishing and implementing volume reduction would be to convince the waste generators that there is economic benefit to producing less waste.

The Authority has carefully studied the amount of waste produced in Texas and is confident that an immediate 40 percent reduction could be achieved by the non-utility generators in the state if the regulatory changes that I mentioned earlier are made. In fact, if certain waste streams were deregulated through _de minimis_ regulations of the Environmental Protection Agency, and others, when appropriate, were allowed to be disposed of locally in municipal landfills, there would be a significant cost savings to the generators of radioactive waste in Texas. In fact, this may preclude the construction of on-site storage facilities and further investment in volume reduction technology.

In conjunction with our on-going technical studies, we have identified volume reduction technologies already employed in the State of Texas in our hospitals and university systems, which are the primary generators at present. Some of the more common volume reduction technologies in place at present include sorting and segregation of the waste, storage on-site for decay, incineration, and compaction either in large industrial compactors or in under-the-counter, small, kitchen-type compactors which are readily available from any appliance store.

The State of Texas is willing to work with the sited states to come to an equitable volume reduction percentage rate and allocation system; however, to ensure there is an incentive for good waste management practices, the volume quotas should be consistent whether the reactor in question is located in a sited or unsited region. This will ensure that volume reduction requirements will be uniformly applied throughout the country.

The State of Texas has in the past and will continue in the future to work aggressively towards a solution to the low-level radioactive waste disposal issue. We have committed the time and resources to this solution, but it will take the cooperation of the federal government and all of the states to reduce the volumes of waste generated throughout the country and to achieve a timely resolution of the national waste problem.

Future confidence in nuclear technology will be measured against how well we perform now. We must do this job right and establish a track record for dealing with these issues. Our three years of experience in dealing with the low-level radioactive waste issue has taught us that we must be tenacious and consistent in our approach, while doing all that is possible to gain the confidence of the public. Radioactive waste disposal facility development is difficult now. Without the earned confidence of the public, it can only become more difficult in the future.

Senator SIMPSON. Thank you very much, Mr. Blackburn.

Ms. Kany.

STATEMENT OF HON. JUDY C. KANY, A STATE SENATOR FROM THE STATE OF MAINE, ON BEHALF OF THE LOW-LEVEL RADIOACTIVE WASTE SITING COMMISSION

Senator KANY. Mr. Chairman and Senator Stafford, I am Maine State Senator Judy Kany and I am pleased to appear before you today in support of the amendments. I am speaking as chairperson of the Low-Level Radioactive Waste Siting Commission of the State of Maine.

The commission was established by law in 1981 to advise the Governor and legislature with respect to low-level waste policy. Its membership includes representatives of both the executive and the legislative branch and of licensees.

The State of Maine has accepted its responsibility under the Federal Low-Level Waste Policy Act of 1980. We have formed a Low-Level Radioactive Waste Commission. We have conducted technical and policy studies. We have discussed cooperation with other States. We have enacted a general framework of low-level waste setting laws. We have assessed our waste generators $10 per cubic foot to support these planning activities.

Maine has a commercial and one Federal generator of low-level waste, generating about 10,000 cubic feet per year. The Maine Yankee Nuclear Power Plant generates well over 90 percent of the commercial waste in the State. The rest comes from several university and private biological research laboratories. Our hospitals are not shipping wastes.

In addition, the Portsmouth Naval Shipyard generates about 1,000 cubic feet per year, which has been disposing of in the commercial facilities in the country.

In the deliberations of our Low-Level Waste Commission, certain principles have emerged. The waste disposal plan must be environmentally safe and be fair and reasonable.

Our DEP, our Department of Environmental Protection, has conducted technical studies with State and U.S. DOE funding. They have found that it may be feasible to site a low-level waste facility in Maine safely, consistent with the 10 CFR 61 regulations—and I wish Senator Domenici were here—because our water table is high and the frost line is deep. The waste would have to be placed below the water table or above ground.

In either case, an engineered facility would be required. Simple shallow land burial would not be adequate. And I would add to my prepared testimony that the water table in Maine is typically 6 feet below the surface, slightly different than at the Hanford Reservation which I recently visited, where the water table is 250 to 300 feet below the surface. Certainly, shallow land burial is feasible within the United States, but not necessarily in every State, and not necessarily in every region of the country, as Senator Stafford's excellent question suggested.

Our State geologist recently stated at a public meeting in which Mr. Robert Browning—who is in the audience today, the Director of Licensing for the U.S. Nuclear Regulatory Commission—was present—our State geologist, Walter Anderson, stated that it may be impossible to site a disposal facility in the State of Maine under part 61.

We have completed preliminary studies of two small disposal facilities in northern New England: a shallow land burial facility and an earth-mounded bunker. Our studies so far have led us to believe that it is feasible and if regulatory approval can be obtained from the NRC, it would be preferable for any facility in Maine to use engineered above-ground construction rather than shallow land burial.

Further, to veer away once again from my prepared testimony, I would suggest that perhaps one of the reasons the Northeast has had such a great difficulty arriving at regional compacts is because of our climate problems and our geology.

In addition, these studies allow us to conclude that a small low-level waste facility can be operated just as safely as the large facility. In fact, it has at least one advantage. If there is a small problem, it may be a smaller problem if the facility is small.

The annual disposal costs for a Maine-only site would be about $1 million compared with $250,000 paid by Maine Yankee in 1983. Several prior years found Maine Yankee spending $500,000 on low-level waste disposal. Although the difference is substantial, it is affordable, about 3 cents per month on the average residential electric bill.

And I would like to point out for Senator Simpson and others who perhaps are not familiar with Point LePreau, that Point LePreau built and engineered above-ground, long-term storage facility, 50 to 100 years, which would be considered perhaps a disposal facility under current thinking by the NRC and the DOE, at a cost of only $1 million for a standard size new nuclear powerplant which has been operating just 2 years.

A Northern New England—Maine, New Hampshire and Vermont—facility, although still small, would enjoy significant financial advantages, saving Maine generators about $600,000 a year. Continuing to dispose of our low-level waste at a really large facility could save $200,000 more, all insignificant amounts when considered as part of the cost of production of electricity by this means.

Our discussions with other States have not yet led to agreement. Maine chose not to join the proposed 11-State Northeast Compact 2 years ago because, although Maine generates less than 1 percent of the waste, we would have had the same responsibility to host a site region as the large States which generate 20 to 30 percent of the waste. Our citizens felt that would have been grossly unfair.

We have also approached the largest nearby generating States, New York and Massachusetts, indicating our interest in becoming a user if they should decide to develop a disposal facility for their own purposes. New York has not yet responded, but at the invitation of Massachusetts, the northern New England States have recently begun talks with Massachusetts to explore the possibility of a compact which should be mutually advantageous.

We are hopeful that something can be worked out. That would help the host support their facility and would give us access to a large site with its accompanying economies of scale.

Finally, if an acceptable interstate agreement cannot be negotiated, we are prepared to recommend that Maine go it alone and develop a facility to dispose of the waste we generate within our State. For legal reasons, that would be a State-operated facility.

Our value system in Maine has always indicated that it would prefer to take the responsibility for that which is generated and benefited by the citizens of our State.

The present Low-Level Waste Policy Act causes certain problems in our efforts to meet the State's responsibility. We believe these bills go a long way toward solving these problems, but I do have some specific comments that we would like you to consider.

No. 1, we support the conditions on interim access, which seem reasonable to ensure good faith and to protect the interests of the host State.

The milestone requirements for interim access to regional disposal facilities are stringent and they appear to be sufficient to ensure good faith on the part of unsited regions or States in preparing to take full responsibility for their own wastes.

The first milestone may require some interpretation for those States, like Maine, whose constitutions provide for a referendum. In that case, action by the Governor in the legislature before the deadline should be taken as sufficent performance, even though final ratification of a compact or enactment of siting legislation might not be possible before the people vote in the November general election.

We would prefer a clear statement in the statute that individual States which develop disposal facilities to meet their obligations under the act are not responsible for meeting the needs of other States as well.

Defense waste brings special concerns. Portsmouth Naval Shipyard now generates about 1,000 cubic feet per year which is shipped to commercial sites, but because of the special nature of defense activities, we cannot be certain of the future content of that waste stream. For example, decommissioning of nuclear submarines could involve significant additional quantities of waste.

The Federal Government has 14 waste disposal facilities of its own scattered around that are not available to commercial generators. These can easily handle the submarine decommissioning waste.

We strongly support the provision of the bill that sends submarine decommissioning waste to Federal disposal facilities. However, we do have one technical suggestion. We understand that at decommissioning, title to the low-level waste is transferred from the Department of Defense to the Department of Energy. Only if this happens does the exclusion of the bill for atomic energy defense activities of the Secretary of Energy come into play.

We suggest either extending the exclusion to all nuclear submarines decommissioning wastes, whether DOD or DOE, or requiring that before disposal, title to that waste be transferred to DOE. And we really ask that that technical change be adopted, which is different than the House version.

Under existing law, States have responsibility for "greater than C waste," that waste which is too radioactive for near-surface disposal under NRC regulations. We simply do not have the capability of dealing with such hot waste, and strong support the provision in the bill which makes such a waste a Federal responsibility.

Thank you, Mr. Chairman and Senator Stafford. I would be happy to address any questions you may have.

[The prepared statement of Senator Kany follows:]

State of Maine
Senate Chamber
Augusta, Maine 04333

STATEMENT OF
MAINE STATE SENATOR JUDY C. KANY

BEFORE THE
SUBCOMMITTEE ON NUCLEAR REGULATION
SENATE COMMITTEE ON ENVIRONMENT & PUBLIC WORKS
AND THE
SUBCOMMITTEE ON ENERGY & RESEARCH DEVELOPMENT
SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES
UNITED STATES CONGRESS
OCTOBER 8, 1985

Mr. Chairman and Members of the Subcommittee, I am pleased to appear before you today in support of the Low-Level Radioactive Waste Policy Amendment Act of 1985 (S. 1517, S.1578, H.R. 1083).

I am speaking as chairperson of the Low-Level Radioactive Waste Siting Commission of the State of Maine. The Commission was established by law in 1981 to advise the Governor and the Legislature with respect to LLW policy.* Its membership includes representatives of both the Executive and the Legislative branch and of licensees. Commissioner Henry Warren of our Department of Environmental Protection is Vice-chair.

The State of Maine has accepted its responsibility under the federal Low-level Waste Policy Act of 1980.

- We have formed the Low-level Radioactive Waste Commission.
- We have conducted technical & policy studies.
- We have discussed cooperation with other states.
- We have enacted a general framework of low-level waste siting laws (38 MRSA, chapter 14-A, subchapter III).
- We have assessed our waste generators $10 per cubic foot to support these planning activities.

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*The name of the Commission will soon be changed to the Advisory Commission on Radioactive Waste, and its role expanded to include High Level Radioactive Waste. At that time 2 public members will be added.

Maine has 8 commercial and one federal generator of LLW generating about 10,000 cubic feet per year. The Maine Yankee Nuclear Power Plant generates well over 90% of the commercial waste. The rest comes from several university and private biological research laboratories. Our hospitals are shipping no waste. In addition, the Portsmouth Naval Shipyard generates about 1000 cubic feet per year. The total amount of waste is down by about 35% from earlier years because of the volume reduction efforts of Maine Yankee and the other generators. At present, these wastes are shipped to the commercial disposal facilities at Barnwell, SC and Richland, WA.

In the deliberations of our Low-level Waste Commission certain principles have emerged:

- The waste disposal plan must be environmentally safe.

- The waste disposal plan must be fair and reasonable.

Our Department of Environmental Protection has conducted technical studies with State funding and additional funding support from the U.S. Department of Energy. They have found that it may be feasible to site a LLW facility in Maine safely, consistent with the 10 CFR61 regulations. However, because our water table is high and the frost line deep, the waste would have to be placed below the water table or above ground. In either case an engineered facility would be required - simple shallow land burial would not be adequate.

We have completed preliminary studies of two small disposal facilities in Northern New England: a shallow land burial facility and an earth-mounded bunker. Our studies so far have led us to believe that, if feasible and if regulatory approval can be obtained from the Nuclear Regulatory Commission, it would be preferable for any facility in Maine to use engineered above-ground construction rather than shallow land burial.

In addition, those studies allow us to conclude that: A small (7,500 to 30,000 cubic feet per year) LLW facility can be operated just as safely as a large facility. In fact, it has at least one advantage: if there is a problem it may be a smaller problem if the facility is small.

Our studies have also evaluated the economic feasibility of a small facility and found it to be expensive, but not impossible. The cost of siting, licensing and construction is not very dependent on size, so larger facilities would enjoy economies of scale. For a modified shallow land burial facility sufficient for Maine's annual waste and nuclear power plant decommissioning waste the result is a generator price of $129/cubic foot, contrasted with the $21/cubic foot (average) paid to the large existing sites in 1983. The earth-mounded bunker would require a generator price of $130/cubic foot. The added cost for a small site would be partially offset by a $7/cubic foot transportation saving for a local site. The annual disposal cost for a Maine-only site would be about $1 million, compared with $250 thousand paid in 1983. Although the difference is substantial, it is affordable: about 3 cents per month on the average residential electric bill.

A Northern New England (Maine, New Hampshire and Vermont) facility, although still small, would enjoy significant financial advantages, saving Maine generators about $600 thousand per year. Continuing to dispose of our Low-level waste at a really large facility could save $200 thousand more.

Our discussions with other states have not yet led to agreement. Maine chose not to join the proposed 11-State Northeast Compact two years ago because, although Maine generates less than 1 percent of the waste, we would have had the same responsibility to host a site for the entire region as the large states which generate 20-30% of the waste. Our citizens felt that would have been grossly unfair. We have had discussions with Vermont and New Hampshire about a 3-State Northern New England Compact. That would have the advantage that the states are similar in both size and waste volume.

We have also approached the largest nearby generating states, New York and Massachusetts, indicating our interest in becoming a user if they should decide to develop a disposal facility for their own purposes. New York has not yet responded, but, at the invitation of Massachusetts, the Northern New England states have recently begun talks with Massachusetts to explore the possibility of a compact which would be mutually advantageous. We are hopeful that something can be worked out. That would help the host state support their facility and would give us access to a large site, with its accompanying economies of scale.

Finally, if an acceptable interstate agreement cannot be negotiated we are prepared to recommend that Maine go it alone and develop a facility to dispose of the waste we generate within our own State. For legal reasons that would be a State-operated facility.

The present Low-level Waste Policy Act causes certain problems in our efforts to meet the State's responsibility to provide for the availability of disposal capacity. We understand the Senate bills are similar, but have not had a chance to review their text, so the remaining comments refer to H.R. 1083 as reported by the House Committee on Interior & Insular Affairs. We believe that bill goes a long way towards solving those problems, but we do have some specific comments we would like you to consider.

Interim access. Access to existing facilities after January 1, 1986 is very important. After the decision is made to start on a new disposal facility, our studies show that it would take approximately 6 years to select a site and license and build the facility. Most of our generators have only 1 or 2 years on-site storage capacity, although Maine Yankee is now building a 5 year storage building. We strongly support the provisions in the bill for interim access until 1993 to bridge this gap. That gives states in unsited regions a fair opportunity to develop new sites before the exclusion provisions of the LLW Policy Act take full effect.

We support the conditions on interim access, which seem reasonable to ensure good faith and to protect the interests of the host state.

The allocation of 41,832 cubic feet of disposal capacity which would apply to the Maine Yankee power plant for the 4-year period beginning January 1, 1986 is slightly higher than their projected waste generation. The more general availability of interim capacity for waste from non-reactor sources should easily satisfy the needs of Maine's other generators, which generate only a small volume anyway.

The "milestone" requirements for interim access to regional disposal facilities are stringent, and they appear to be sufficient to ensure good faith on the part of unsited regions or states in preparing to take full responsibility for their own wastes. These milestones require each state to:

- (by July 1, 1986) ratify a compact or enact legislation indicating the intent to develop its own site;

- (by January 1, 1988) identify the host state and a detailed procedure for siting and licensing a facility; and

- (by January 1, 1990) apply for an operating license for a facility or certify that the state will provide for its own waste after December 31, 1992.

The first milestone may require some interpretation for those states like Maine whose constitutions provide for a referendum. In that case, action by the Governor and the Legislature before the deadline should be taken as sufficient performance even though final ratification of a compact or enactment of siting legislation might not be possible before the people vote in the November general election.

Single-State Sites. In some circumstances the most responsible way for a State to provide for disposal capacity may be to go it alone. We believe that option is authorized under present law. And this bill strengthens that belief.

We would prefer a clear statement in the statute that individual states which develop disposal facilities to meet their obligations under the Act are not responsible for meeting the needs of other states as well.

Defense waste. Defense waste brings special concerns. Portsmouth Naval Shipyard now generates about 1000 cubic feet per year of LLW, and ships it to a commercial disposal site. But, because of the special nature of defense activities we cannot be certain of the future content of that waste stream. For example, decommissioning of nuclear submarines could involve significant additional quantities of waste. The federal government has 14 waste disposal facilities of its own, scattered around the country, that are not available to commercial generators. These can easily handle the submarine decommissioning waste.

We strongly support the provision of the bill that sends submarine decommissioning waste to federal disposal facilities. However, we do have one technical suggestion: We understand that, at decommissioning, title to the Low Level Waste is transferred from the Department of Defense to the Department of Energy. Only if this happens does the exculsion of the bill for atomic energy defense activities of the Secretary of Energy come into play. We suggest either extending the exclusion to all nuclear submarine; decommissioning waste, whether DOD or DOE, or requiring that before disposal title to that waste be transferred to DOE.

Definitions. Under existing law the States have responsibility for "greater than C waste", that waste which is too radioactive for near surface disposal under NRC regulations.

We simply do not have the capability of dealing with such hot waste, and strongly support the provision in the bill which makes such a waste a federal responsibility.

Thank you, Mr. Chairman, I would be happy to address any questions you may have.

HW/elk/1267

Senator SIMPSON. Thank you very much, Senator Kany.

Let me ask Mr. Blackburn, Texas is the one State now, so far, that has clearly indicated that it intends to go it alone and develop a Texas-only disposal site. Based upon your reading of the Low-Level Waste Policy Act, are any additional changes going to be required in the act for any State that wants to go it alone, like maybe Maine might decide to do, or are you satisfied you can pursue this option within the existing State or the law as it will be amended by S. 1578?

Mr. BLACKBURN. Senator, basically it boils down to how you're going to operate the site. Within the State of Texas, the license to operate the site will be held by the State of Texas. The operator of the site will also be the State of Texas. It will be a State function.

It doesn't interfere with interstate commerce in that respect. For another individual State going it alone, if they were going to bring in a commercial operator, we'd feel then that they would not have the protection that we feel we have by operating as a State function.

So for another State to go it with a commercial operator, they would have to have some type of change in the language to provide them with the exclusionary capabilities.

Senator SIMPSON. Are you both satisfied that the milestones that are referred to in S. 1578 are achievable and yet firm enough to provide for a prompt transition during this 7-year period?

Mr. BLACKBURN. Yes, sir. From the State of Texas' point of view, we feel that they are very reasonable.

Senator KANY. Yes. From the State of Maine's point of view, we also would think that they are reasonable.

Senator SIMPSON. With regard to your State of Maine, you described the situation as to geography and ground conditions citing hydrological studies, and that is, very assuredly, an issue. What is the extent of interest in your States in alternatives to any kind of process? In particular, your brief thoughts on additional information or guidance that the Federal Government might provide the States and the compact areas on specific recomendations for alternatives.

Mr. BLACKBURN. Senator, when we first started our siting effort, we proposed standard shallow land burial practices in the southern part of the State. Since that time, we've moved to the western part of the State, which would not readily support standard shallow land practices. So in the State of Texas, we will probably go to some type of an engineered structure.

I think it would be beneficial for us. We have had discussions in the past with NRC, but we would like to see, I guess, something more concrete as far as the licensing approach for alternative disposal mechanism.

Senator **Kany**. Senator Simpson, Senator McClure's question earlier asked if the development of alternatives to shallow land burial was perhaps falling between the cracks of the agencies, and I believe that it has. I see Federal law as perhaps giving that responsibility to development and advocation to the DOE, and I don't believe that the DOE is actually providing great assistance or really developing alternatives to shallow land burial.

I do believe that the U.S. Nuclear Regulatory Commission has gone quite far, given its statutory role of primarily being a regulatory agency in at least providing and contracting out to the engineers to make certain that there is some information available regarding alternatives to shallow land burial.

So I do see that DOE is perhaps not fulfilling its role perhaps because of budgetary constraints or for other reasons. And second, the second portion of your question—I know there was something I wanted to answer.

Oh, I know what it was. It had to do with the development of the Nuclear Regulatory Commission rules and regulations. And as a State, we have tried to participate. We've always seen those rules as evolving. Of course, when the law passed in 1980, the only possible thing anybody even conceived of was shallow land burial, and it is really only recently that we have part 61 available to us.

And until just recently, I guess, we in our State saw that those regulations might evolve to the point where we, as a State, might be able to meet the criteria if it included an engineered facility that we could engineer to meet the criteria. But Mr. Browning's staff assured us, and Mr. Browning assured us that that was not the case; that that is simply not evolving; that they intended to have the geological criteria be met, not to be engineered to be met. And under those circumstances, that is why we now believe that it is very likely that we could not site a facility in our State.

Senator **Simpson**. Let me just ask one final question on surcharges as authorized under S. 1578, and the response from you as to whether these are appropriate, and should the funds generated by the surcharge or any surchage be channeled to a certain use, perhaps by unsited compact States in achieving the objective of siting and constructing of new regional disposal sites. What is your thought on that?

Mr. **Blackburn**. Within the State, we feel that the surcharge structure is punitive, and we feel that it's somewhat justified. However, it has been discussed in the past of rebating a portion of the moneys back to States and earmark it specifically for the development of further disposal sites.

We feel that that would be advantageous to the entire country. However, you also have to balance the whole situation. It's kind of late to upset the apple cart, so to speak. I'm sure there's an amenable decision that can be arrived at, but I think it's pretty delicate.

Senator KANY. Senator Simpson, it does seem reasonable. If many States, particularly in the Northeast, have indicated that they could only see alternatives to shallow land burial in their regions, if the regionality provision of the law is going to be kept—and it looks as if it will be intact—then that would be certainly a reasonable use of any such funds.

Senator SIMPSON. Thank you.

Senator Stafford.

Senator STAFFORD. Thank you, Mr. Chairman. I want to compliment Senator Kany on her presentation here today. I think she has spoken well for the problems that the northern New England States are facing.

I may submit a few questions in writing if that's agreeable, to both of the members of the panel.

One intriguing question occurred to me and that was, Senator Kany, you said in your statement that your hospitals weren't shipping their low-level waste. What are they doing with it?

Senator KANY. They were shipping waste until about a year or so ago when the new de minimus regulations of the NRC were promulgated. And perhaps the type of work which is done in the hospitals in Maine is not the same type of work that is done in hospitals in Massachusetts or perhaps the University of Vermont or Dartmouth.

Senator STAFFORD. Does that mean that whatever waste they have, they are retaining within their own buildings?

Senator KANY. Or sending to Massachusetts or from whence it came, to a broker perhaps. And the question of brokers has not really been addressed by anyone that I'm familiar with.

Senator STAFFORD. You also talked about a surface containment system rather than a shallow burial. Have any of the other New England States taken a look at that sort of a system?

Senator KANY. Yes, Senator Stafford, and I believe legislation before New York State Legislature would indicate that there is only interest in New York State in alternatives to shallow land burial. And the Massachusetts Legislature has also spoken to that. The individuals within the State of Vermont and New Hampshire and other New England and Northeastern States that I have had contact with also expressed the preference for an alternative to shallow land burial because of the climatic and geological factors.

Senator STAFFORD. And one of those, of course, would be the high water table that you referred to.

Thank you very much. Thank you, Mr. Chairman.

Senator SIMPSON. Thank you, Senator Stafford.

Let me say that you bring to us some provocative matters and indeed Maine is very similar to Vermont and New Hampshire and Rhode Island in this area, a small generator State that hasn't joined a compact. I think we'd like to have further information from you for the record on what particular steps you would like us to take in the consent legislation to address those concerns.

And remember, too, that I come from a very small generator State, a very large geographical State, which could geographically host such a facility, but in the compact that my State entered into with 11 States, we had a provision in it—and I think you might want to pursue it—that each party State, in accordance with projections made by the board—if they generate 20 percent or more of the low-level waste generated in the region, they have an obligation to be the host State.

So that you are always relieving the low generator State of that burden. I think you might want to pursue that. That's a fine opening, and we'll work very closely with the chairman, and of course, interestingly enough and oddly enough, there are six members of our committee who come from States without compacts. Would you believe that? Isn't that fascinating?

Senator KANY. Senator Simpson, I would like to say that during negotiations for a northeast compact, which at one time involved 11 States, the State of Maine did suggest a threshold, and when that was denied and was not included in the final version, then Maine passed a vote against the northeast compact.

Senator SIMPSON. I see; OK.

Senator KANY. And it always made sense to me and it makes sense, looking at the Appalachian compact that's being proposed, it is reasonable. Thank you for your comments.

Senator SIMPSON. I can tell you we will be observing it very carefully and it needs attention. There is no reason why any State with the very small generation that Maine produces, probably less than any State in the Union perhaps, should have a perilous prospective of being a host State, especially with these other things you mentioned.

And I thank you very much.

Now, please, the final panelist this morning. Mr. William Berry, chairman of the Virginia Power Co. of Richmond, VA, on behalf of the Edison Electric Institute, the American Nuclear Energy Council, and the Utility Nuclear Waste Management Group.

Mr. Berry, please.

STATEMENT OF WILLIAM W. BERRY, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, VIRGINIA POWER CO., RICHMOND, VA, ON BEHALF OF THE UTILITY NUCLEAR WASTE MANAGEMENT GROUP, THE EDISON ELECTRIC INSTITUTE, AND THE AMERICAN NUCLEAR ENERGY COUNCIL

Mr. BERRY. Thank you, Mr. Chairman. I appreciate the opportunity to appear today on behalf of the Utility Nuclear Waste Management Group, the Edison Electric Institute, and the American Nuclear Energy Council.

I've submitted a written statement and ask that it be included in the record.

The public and investor-owned utilities which I represent strongly favor legislation that will continue access to the existing disposal sites by unsited regions and States, while fostering progress in the development of new sites.

We've consulted with the Governors of the States that are now bearing the responsibility for the disposal of low-level waste. We understand their desire to ensure that new disposal facilities are created in all parts of the country, and we appreciate their willingness to support a reasonable transition period in which access to the existing sites would continue.

I believe we and they are of one mind on the key elements that are needed in legislation. We and they believe that H.R.1083, as reported in July by the House Interior Committee, is a delicately balanced compromise which has evolved with inputs and concessions by all the concerned parties.

We would hope that the key elements of H.R. 1083 would be the basis for legislation that will be enacted by year end. We agree that continued access to existing disposal sites should be conditioned on compliance with specified siting milestones. This conditionality of access is necessary to encourage the prompt development of new disposal capacity. If it becomes necessary to deny or suspend access because of failure to meet the siting milestones, that should be done on a nondiscriminatory basis.

In other words, the loss of access should be borne equally by all the generators of low-level waste within the affected region or State.

We recognize the desire of the current host States to reduce the volume of waste that they receive during this interim period. However, the volume limitations included in the legislation must be sufficient to meet current and future disposal needs of the nuclear industry. The limits should reflect the fact that the utilities have already achieved substantial reductions in the volume of their low-level waste.

We would urge that the legislation provide for flexibility in the allocation system and for unusual circumstances that may result in larger-than-normal volumes of waste. We believe that a transition of 7 years is needed to allow the regions in the States time to complete the siting, licensing and construction of new disposal facilities and we support the inclusions of provisions requiring the NRC or agreement States to expedite the completion of their licensing reviews.

It's very important, not only to the nuclear utilities, but to all generators of low-level waste, that we continue to be able to dispose of this waste in a safe, efficient, and orderly manner. We therefore hope that Congress will enact legislation along the lines of H.R. 1083 and will give its consent to the pendng regional compacts during this session of Congress before the end of this year.

Thank you. I'd be glad to answer any questions.

[The prepared statement of Mr. Berry follows:]

STATEMENT OF WILLIAM W. BERRY
BEFORE THE
ENERGY RESEARCH AND DEVELOPMENT SUBCOMMITTEE
ENERGY AND NATURAL RESOURCES COMMITTEE
AND THE
NUCLEAR REGULATION SUBCOMMITTEE
ENVIRONMENT AND PUBLIC WORKS COMMITTEE
UNITED STATES SENATE
OCTOBER 8, 1985

Mister Chairman and Members of the Subcommittees: I am pleased to have the privilege of appearing here today to testify concerning legislation currently before Congress relating to the low-level radioactive waste compacts. My name is William W. Berry and I am Chairman and Chief Executive Officer of Virginia Power. I am also Chairman of the Edison Electric Institute's Task Force on Low Level Radioactive Waste Disposal.

My testimony is being presented on behalf of the Utility Nuclear Waste Management Group (UNWMG), as well as the Edison Electric Institute (EEI) and the American Nuclear Energy Council (ANEC). UNWMG is an organization of 46 publicly-owned and investor-owned electric utilities formed to monitor and assist in the resolution of nuclear waste management issues. EEI is the national association of investor-owned electric utilities, whose members serve 73 percent of all ultimate electric utility customers in the nation. ANEC represents more than 100 organizations having an interest in nuclear power, including private, public and cooperatively-owned utilities, manufacturers, architect-engineers and firms performing various nuclear fuel cycle activities.

UNWMG, EEI and ANEC have previously testified, on a number of occasions, on the regional compacts. We have actively endorsed the program established by the Low-Level Radioactive Waste Policy Act of 1980 (Policy Act) and have consistently urged prompt Congressional approval of the compacts. We have also worked diligently, with other interested parties, to help in the orderly implementation of the Policy Act.

When the Policy Act was passed by Congress in 1980, it was anticipated that states -- either individually or, preferably, through regional compacts -- would have sufficient time to develop additional low-level waste disposal capacity so that by January 1986, presently operating disposal sites could begin reducing and restricting the amount of waste received from outside of their respective regions. While a great deal of progress has been made in establishing the organizational framework necessary for creating regional compacts, progress in developing additional disposal sites has been disappointingly slow.

The principal question we are now confronting can be simply stated: By what means can interim disposal capacity be provided that will also, at the same time, promote the prompt development of new sites? In addressing this question, the electric utility industry has joined the Governors of the three existing host states to work toward an answer on the basis of the key provisions of H.R. 1083, as reported by the full House Interior and Insular Affairs Committee last July.

H.R. 1083 represents a delicately balanced compromise which has evolved, based on input and concessions by all parties concerned. Further, it incorporates essential elements, necessary to address relevant issues, which other legislation is lacking.

Perhaps the most important element is continued access to the existing disposal sites by presently unsited regions and states, while at the same time maintaining satisfactory progress in the development of new sites. Compliance with specified siting milestones, as a condition of continued access, is necessary to encourage the prompt development of new disposal capacity. However, suspension or denial of access based upon the failure to meet such milestones must, of course, be applied in a non-discriminatory manner, so that the burden resulting from the loss of access will be borne equally -- as is appropriate -- by all generators in the affected region or state.

Assuming compliance with the designated milestones, it is essential that adequate interim disposal capacity be made available to assure that, pending the development of new disposal sites, low-level waste will continue to be disposed of in an efficient and orderly manner. We recognize the desire of current host states to reduce the volume of waste they receive during the interim access period. If such volume limitations are to be established, they must recognize that a substantial amount of volume reduction has already been achieved by utilities, and they must be sufficient to meet the current and future disposal needs of the nuclear industry, including additional waste volumes from anticipated new sources of generation.

In this connection, inter-reactor and inter-utility trading of waste allocations will provide needed flexibility to assure a workable allocation system. It must also be recognized, however, that unusual circumstances or special conditions may occur, requiring that additional disposal capacity be made available. Accordingly, provisions must be included providing adequate capacity in the event of unusual circumstances (such as necessary, but irregular, maintenance at nuclear power plants) or conditions which pose potential threats to public health and safety. With respect to the allocation of additional capacity for unusual circumstances (such as steam generator repairs or replacements), we believe that the utility industry itself can best determine how such an allocation should be apportioned, and we favor authorization of an industry organization to perform that function.

Another essential consideration is the length of the transition period during which continued access to the existing disposal sites (given compliance with the siting milestones) must be assured. A period of seven years is necessary to permit states and regions to complete the process of siting, licensing and constructing new disposal facilities. Furthermore, to assure that new capacity is made available in a timely manner, regulatory reviews must be completed on an expedited basis. We therefore favor provisions requiring the NRC or Agreement States to complete their licensing reviews in an expedited manner.

UNWMG, EEI and ANEC believe that the current version of H.R. 1083 addresses many of the matters I have just mentioned, and is the most appropriate vehicle that now exists for resolution of the current impasse over interim access to the existing disposal facilities. H.R. 1083 represents a reasonable and workable legislative compromise -- hammered out over a period of many months -- which could serve to resolve, during this session of Congress, basic issues which have thus far inhibited full implementation of the Policy Act.

To conclude, we believe that certain basic elements are essential aspects of any legislative effort to bridge the gap between the present and the time when additional low-level waste disposal capacity will become available throughout the nation. Those elements should help to provide an effective and workable mechanism which will assure the prompt development of new disposal facilities, as well as adequate interim access to existing disposal facilities. H.R. 1083 represents the best alternative to date among current legislative proposals. We believe very strongly that appropriate resolution of this important issue, as well as consent to individual compacts, can and should be accomplished in this session of Congress.

Senator **Simpson**. Thank you very much, Mr. Berry.

One of the suggestions made by some utilities is that the surcharges imposed under S. 1578 be rebated to the unsited States or compacts for the purpose of assisting them in the development and construction of new regional disposal sites.

Would you comment on that approach, please, and in particular, give us your view on whether you think that approach might actually assist the development of new sites?

Mr. **Berry**. Well, the development of new sites is going to take money. Our experience in the Southeast Compact Region has shown a difficulty in coming up with the funds to do the work necessary to develop new sites. So we would support the concept of a rebate.

I say that with some trepidation because we have reached agreements with the Governors of the three host States on H.R. 1083, which does not have the rebate provision. We would like to proceed in agreement with them, so that this legislation proceeds smoothly and expeditiously through the Congress.

I believe, but I cannot say for certain, that the Governors would also support that rebate provision.

I think there is a question of where the rebates should go. The compacts themselves need some money, but I doubt if they need the amount of money that would be generated by those rebates. So it would seem to me that perhaps a solution would be to have some portion of the rebates go to the compacts and and the rest of it go to the States.

And we would support that, subject to agreement by the three host State Governors.

Senator **Simpson**. Some have criticized the measure for penalizing the generators of low-level waste when the States or the compacts fail to meet required milestones. Is that a problem in your view, and what steps should the Congress take to ensure that generators do not bear the entire burden for the failure of States or compacts to meet the deadlines?

Mr. **Berry**. Well, we're concerned about the teeth that are in those milestones and the fact that the sanctions are imposed on the generators and not on the States that bear the responsbility for resolving and developing new sites.

Additional sanctions directly on the States have merit, but again I think we would accept the compromise as proposed in 1083 as being an acceptable compromise. I think we need to be concerned in this legislation and reminded that perfect is often the enemy of the good, and we need to get an acceptable piece of legislation through here, and I doubt if it will be the perfect piece for any of the parties involved.

So we think it's a good idea to impose sanctions directly on the States, but we recognize the political difficulty of achieving that.

Senator **Simpson**. Well, we've never worried about perfection here. [Laughter.]

Mr. **Berry**. I was counting on that.

Senator **Simpson**. What's that?

Mr. **Berry**. I was counting on that.

Senator **Simpson**. Yes, that's right.

One of the witnesses that we will hear from later today, Quadrex Corp., will testify that some remarkable progress is being made by companies such as that company in not only reducing volume, but actually decontaminating of equipment and hardware and returning it to the utilities for use.

How much potential is there in your view for an approach like chemical or mechanical processing to reduce the amount of waste that currently goes to a low-level disposal site?

Mr. BERRY. The utilities have already done a lot to reduce the volume of waste that they generate, and there are additional techniques available to further reduce the volumes. And we can live with the constraints that are contained in H.R. 1083 that require further reduction by utility generators as new plants come on line and as time passes.

So we will have to enact steps to achieve a reduction in volume. I would have to point out that those reductions don't come for nothing. There are costs involved, and there are some steps that we are taking that are relatively inexpensive. As we take additional steps, the costs begin to go up dramatically. But there are ways to reduce the volume of radioactive waste.

I think it's important to bear in mind, though, that when you do reduce the volume, you do not reduce the radioactivity. You simply put it in a smaller package; the number of curies or whatever measure you want to use, the radiation remains the same. You just make a smaller package.

Senator SIMPSON. Just a final question.

How much of the low-level waste currently generated by utilities could be deregulated if the NRC were to promulgate some de minimus rule which would eliminate certain types of wastes from the requirement that they must be disposed of in a low-level facility?

Mr. BERRY. I don't have a study to prove a number, but the idea of having below regulatory concern, we would not have to dispose of it in this elaborate facility, would cut the volume 10 to 20 percent. And that's a personal opinion.

Senator SIMPSON. I see that my good colleague from Virginia has appeared like a phantom from the back room. He and I came to this fascinating arena at the same time and I thoroughly enjoy him and watch his able abilities.

Do you have anything you wish to communicate here?

Senator WARNER. Mr. Chairman, this is committee room. You're an invitee here. [Laughter.]

Senator SIMPSON. I have something pasted to the desk here. It says in the event of a disturbance during a hearing, the chairman will call the word "Warning." Then the committee will stand in recess until the police can restore order. Is that what goes on in here? [Laughter.]

We don't have that in my hearing room.

Senator WARNER. Well, I wanted to make sure that my distinguished chairman of our utility was treated fairly down here and not subjected to any sagebrush rebellion from you.

I have read through his testimony, and we appreciate very much the wisdom and intellect that you bring to this issue and the fact that you basically support what took place now.

Thank you, Mr. Chairman.

Mr. **Berry**. Thank you, Senator. Appreciate you looking out for me.

Senator **Simpson**. John, we have heard some very interesting testimony. We have a lot of good information to process, and I think we're on the track toward an important solution to a critically important national issue. I appreciate using the committee room.

That will conclude this section of the hearing. We will continue again at 2 o'clock this afternoon. I will be unable to return and I belive Senator Hecht and Senator Evans will be here this afternoon to continue with the hearing. I want to thank the staff for their excellent work assisting me in the preparation, Jim Curtiss, Marilyn Meigs, Priscilla Gallerano, Terri Miles, Dan Berkovitz, Kate Kimball, Ben Cooper, and K.P. Lau.

And I thank you, and that will conclude this morning's activity.

[Whereupon, at 12:40 p.m. the hearing recessed, to reconvene at 2 p.m., this same day.]

AFTERNOON SESSION

Senator **Hecht** [presiding]. The Senate Committee on Energy and Natural Resources, Subcommittee on Energy Research and Development, and the Senate Committee on Environmental and Public Works, Subcommittee on Nuclear Regulation, will now continue the joint hearing on Low-Level Radioactive Waste Disposal.

To begin with, I'd like to issue a statement myself.

STATEMENT OF HON. CHIC HECHT, A U.S. SENATOR FROM THE STATE OF NEVADA

Senator **Hecht**. The issue of low-level nuclear waste disposal is very important to the Nation, but it is particularly important to Nevada. The people of Nevada have gone out of their way to be of assistance to the rest of the country in disposing of low-level nuclear waste. Nevada contains one of the three approved sites in the whole country for disposing of these wastes. Nevada has been willing to accept these wastes from sources thousands of miles away from our beautiful State.

When the American public, through their representatives in Congress, recognized the need to share the burden of low-level nuclear waste disposal, Nevada agreed to continue to accept these wastes until the other States got organized to handle waste within their own geographic regions.

Nevada, for its part, joined with nearby States in a compact of the type that Congress intended.

Unfortunately, a number of States have as yet been unable to agree on a way to handle their own waste. The people of Nevada regret this, but they are not prepared to go on forever accepting the wastes of States from outside the compact Nevada has joined.

It is simply not fair for Nevada, South Carolina and Washington to be expected to indefinitely receive all of our Nation's low-level nuclear wastes. That is why I am a cosponsor of S. 1578. This bill provides a series of incentives, not disincentives, to encourage those States that have not yet joined a compact to face up to their responsibilities and do the right thing. Nevadans are generally willing to give other States the additional time to enter into the necessary compacts.

The States of Nevada, South Carolina, and Washington have repeatedly demonstrated their willingness to compromise and be reasonable as legislation similar to this has moved to the legislative process in the House. There is still time for the Congress as a whole to take the necessary action to beat the January deadline.

It is in the interest of all of the States of the Union to pull together so the Nation is not faced with the threat of major disruptions in its low-level nuclear waste disposal capability. It is my hope that the two Senate committees with jurisdiction on this issue will move swiftly and report this legislation so that a crisis does not result in January.

Now, panel No. 7, will you please take your respective seats?

Mr. Richard Paton, you may proceed.

STATEMENT OF RICHARD F. PATON, EXECUTIVE DIRECTOR, MIDWEST INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMMISSION, ST. PAUL, MN

Mr. PATON. Thank you, Mr. Chairman.

Mr. Chairman, I am Richard Paton, and I am the executive director for the Midwest Interstate Low-Level Radioactive Waste Commission. On behalf of the commission I'd like to thank you for the opportunity to share with you today some of our comments and concerns regarding revisions to the Low-Level Waste Act.

In addition to my oral testimony, I've provided some more detailed written testimony. I will ask that that please be inserted into the record in full.

In addition, as we move forward in modifying and working on further revisions, I would be happy to work with the committee and committee staff in any way that we might provide some assistance.

The Midwest compact consists of seven States: Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin. For the past year and a half, we have been working very closely with congressional staff, the NGA, regional producers of wastes, State interest groups, to draft amendment language that is reasonable and achievable.

Throughout our discussions the Midwest compact has consistently raised four points:

First, the Midwest compact believes that an extension to the January 1, 1986 exclusionary date and the establishment of meaningful milestones are essential. Actions taken this congressional session should help us achieve this national network of low-level radioactive waste and not merely result again in a stop-gap solution that happens to be expedient. The long-term viability of a national system and the public health implications of that system must continually be stressed.

The proposed extended access to existing disposal sites through December 1992 and the various program milestones that are offered in S. 1578 appear to coincide with the Midwest compact's adopted site development schedule.

The second point that we have continually raised deals with the national capacity limits. We believe that setting of capacity limits is necessary to ensure that adequate disposal capacity during the 1986 to 1992 interim period are necessary. Such limits will require major reductions in volume on the part of waste producers. In the Midwest region, many of our generators are already implementing aggressive volume reduction programs.

The national capacity limits and the mechanisms that are described in S. 1578 for ensuring volume reductions are generally consistent with the commission's principles of fairness and need.

The third issue that I'd like to raise relates to the way in which the waste generators will be assigned to sites. Section 5(a)(3) of S. 1578 describes a process by which the three sited States will collectively determine how to distribute the Nation's waste streams among the three sites. Such a process, however, does not consider the present relationships between the generators and site operators or the differences among the three sites with respect to fees, regulations and site limitations.

Any assignment system should be simple, easy to implement, and minimize the disruption to the present waste disposal arrangements as much as possible. I think a tremendous amount of progress is being made on the House side with respect to this particular element.

The fourth issue deals with surcharges and the penalty issue. The Midwest Commission has repeatedly stated that the use of surcharges must be reasonable. As proposed, the level of surcharges on wastes that would be imposed beginning January 1, 1986, through December of 1992 range from $10 per cubic foot to $40 per cubic foot. These surcharges are in addition to the present disposal costs of $25 to $30 per cubic foot. They're also in addition to State taxes and State long-term care assessments.

The additional surcharges apply only to the wastes from nonsited regions and have the potential of more than doubling nonsited regional disposal costs. Based upon the proposed surcharge rates and the projected waste volumes, we have calculated that the revenues off the surcharge system can well exceed $200 million.

In the Midwest region alone, we estimate that our waste generators will be paying over $30 million in surcharge fees. It is our continued opinion that the surcharge levels as specified in S. 1578 are unreasonably high. However, if Congress finds that high surcharges are necessary as a means for encouraging volume reduction or as an incentive for encouraging the development in new facilities, a mechanism should be devised whereby a reasonable portion of the revenues collected are returned to the compact regions.

Again, there should be a proviso on that, in that the moneys returned should be used for dedicated purposes, for the siting of new low-level radioactive waste activities.

I have very quickly gone through some of the main points that the Midwest Compact Commission has raised throughout our discussions with other compact regions in the sited States, and I would at this time simply say that we're committed to the siting of new facilities for low-level radioactive waste and we're moving forward as rapidly as possible to maintain a national system approach.

Thank you.

[The prepared statement of Mr. Paton follows:]

Midwest Interstate Low-Level Radioactive Waste Commission
Room 588 • 350 N. Robert Street • St. Paul, MN 55101 • (612) 293-0126

TESTIMONY OF RICHARD F. PATON
EXECUTIVE DIRECTOR
MIDWEST INTERSTATE LOW-LEVEL
RADIOACTIVE WASTE COMMISSION

Before the
Senate Subcommittee on Energy
Research and Development
and the
Senate Subcommittee on Nuclear Regulation

October 8, 1985

The Midwest Interstate Low-Level Radioactive Waste Commission welcomes the opportunity to share our comments on revisions to the Low-Level Radioactive Waste Act as proposed in S. 1578.

The Midwest Compact consists of seven states -- Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin -- working cooperatively to address their low-level radioactive waste disposal responsiblities. For the past year and a half the Midwest Compact and its representatives have worked closely with Congressional staff, the National Governors Association, regional producers of waste and state interest groups to draft amendment language to the Low-Level Radioactive Waste Policy Act that is reasonable and achievable. Throughout our discussions, the Midwest Compact has consistently raised four major points:

1. Extension to the January 1, 1986 exclusionary date and the establishment of milestones.

   It is important that as we work to find solutions to the nation's low-level radioactive waste problem we do not lose sight of our primary goal--the establishment of a viable national system to manage low-level radioactive waste in a manner which best protects the nation's public health and safety and still minimizes environmental, economic and social impacts. Actions taken this Congressional session should help us achieve this national network and not merely result in stop-gap solutions that happen to be expedient. The long-term viability of a national system and the public health implications of that system must be continually stressed.

   The proposed extended access to existing disposal sites through December, 1992 and the various program milestones offered in S. 1578 appear to coincide with the Midwest Compact's adopted site development schedule. The Midwest schedule calls for the following actions:

May, 1986	Technical work on a comprehensive regional waste management plan completed.
December, 1986	Host state(s) identified.
January, 1989	Site screening completed and preliminary data on site suitability evaluated.

January, 1990	More detailed site characterization work completed and license application filed.
January, 1993	New site operating.

There is some concern that the licensing phase may exceed the time frame allotted in S. 1578. This is particularly true if a state or region elects to choose a disposal alternative to shallow land burial. It should be noted that the time required for licensing may be beyond the effective control of the Midwest Compact and its member states. Therefore, it is conceivable that having exerted our best efforts and achieved each milestone we may still find ourselves without an operational facility by January, 1993. There needs to be recognition that some actions are beyond the control of states and compacts. Penalties should reflect the reasons for delay or inability to meet milestones.

2. National capacity limits.

The volumes of waste generated in non-sited regions that can be disposed of at existing low-level waste facilities are limited nationally by S. 1578 to about 2.8 million cu.ft./yr. The proposed amendments further define the limits imposed on each disposal site. Setting capacity limits may be necessary to insure adequate disposal capacity during the 1986-1993 interim period. Such limits will require a major reduction in the volume of wastes being produced.

In the Midwest region, many of our generators have already implemented aggressive volume reduction programs. In 1984, the Department of Energy estimated the Midwest low-level radioactive waste volume at 300,000 cubic feet. Our most recent 1985 estimates indicate that the Midwest region generates approximately 210,000 cu.ft./yr.

The Midwest Compact has long argued that in distributing available disposal capacity, the following principles should be applied: (a) allocation of disposal capacity should take into consideration past volume reduction efforts; (b) allocations should be applied in the same manner to all producers regardless of the state or region in which they are located; (c) allocations should be based on what can be safely and practically implemented; and (d) volume reduction requirements for non-utility producers through regulation may be impractical. For non-utility generators market forces may be a more appropriate means for inducing volume reduction.

The national capacity limits and the mechanism established for insuring volume reductions outlined in S. 1578 are generally consistent with the Commission's principles. It should be noted, however, that while disposal access is guaranteed for utility generators that comply with the reduction schedules, no similar guarantee is provided for non-utility generators. The national capacity limits only "assumes" that adequate disposal capacity will remain available for the non-utility generators. This point is raised not as a criticism of the bill but rather as a potential problem that may require future attention should our waste projection estimates be inaccurate.

3. Assignment of waste generators to dispsoal sites.

Section 5(a)(3) of S. 1578 describes a process by which the States of South Carolina, Nevada and Washington will collectively determine how to distribute the nation's waste streams among the three states. Such a process does not consider the present relationships between generators and site operators or differences among the three sites with respect to fees, regulations and site limitations. As described in S. 1578, the assignment process does not allow for input from generators, states or compact regions. An assignment system should be simple, easy to implement, minimize disruption to the present waste disposal arrangements and require minimal administration.

4. Surcharge and Penalties.

A federally imposed surcharge and the application of strict penalties for missed milestones are the two primary implementation tools offered in S. 1578. While it is important to establish tools for implementation, such tools should be justified and take into consideration their impact on public health and safety.

The Midwest Commission has repeatedly stated that the use of surcharges must be reasonable. As proposed in S. 1578 the level of surcharges on wastes that would be imposed beginning January 1, 1986 through December 31, 1992 range from $10/cu.ft. to $40/cu.ft. These surcharges are in addition to present disposal costs, state taxes and state long-term care assessments. The additional surcharges apply only to wastes from non-sited regions and have the potential of more than doubling non-sited regional disposal costs. Such preferential treatment of generators does not seem warranted just because they happen to be located in a state eligible for membership in a regional compact containing a disposal facility.

The Midwest Commission agrees that some compensation may be appropriate for continued use of existing disposal facilities, however, such compensation must be reasonable. Based upon the proposed surcharge rates and projected waste volumes, the revenues to be derived from these surcharges by the States of Washington, South Carolina and Nevada between 1986-1992 can well exceed 200 million dollars.

In the Midwest region alone we estimate our waste generators will be paying over 30 million dollars in surcharges. It is our continued opinion that the surcharge levels as specified in S. 1578 are unreasonably high. However, if Congress finds high surcharges are necessary as a means for encouraging volume reduction or as an incentive for encouraging the development of new regional disposal sites, a mechanism should be devised whereby a portion of the revenues collected are placed in a national fund. This fund should be used for the sole purpose of providing needed financial incentives to states, regions and communities that must site and develop new disposal facilities over the next seven years. It is our opinion that surcharge "rebates" to a national fund would provide further incentives for meeting program milestones. S. 1578 contains numerous "sticks" to promote action but fails to include a sufficient number of "carrots."

Summary

In summary, the Midwest Compact was formed by the States of Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin to cooperatively address their responsibilities for low-level radioactive waste management. To fulfill their responsibilities, an effective program built upon proper planning and sound technical study must be established. Congressional actions this session should help us to achieve this program. Actions that emphasize program expediency above the development of a technically defensible plan of action will only destroy the region's credibility.

The proposed interim access to existing disposal sites through 1992 is a necessity. The milestones established for gauging progress appear achievable, however, it must be recognized that some actions relative to legal review and licensing are beyond the control of states and compacts. In all cases, impacts on public health and welfare should be continually evaluated and any action which threatens public health should be avoided.

Regions and states without existing disposal facilities should not be unfairly penalized through excessive surcharges or conditions. In examining the progress of all states and regions in developing new disposal facilities, we are all on approximately the same development schedule.

Finally, the development of new disposal facilities will require major financial commitments on the part of states and regions. Assistance in developing incentive packages, technical review, site development and site characterization is needed. Financial and technical assistance to the states and regions must be preserved and enhanced if the program is to succeed.

October 7, 1985

To: Each Potential Applicant

Thank you for your letter of inquiry regarding the Cooking, Advancement, Research and Education (CAREF) scholarship.

Please find enclosed an application which must be completed and returned promptly to us. In order to be considered for a scholarship, the application must include all required reference documents, and a check or money order for fifteen dollars ($15) made payable to CAREF. Applications which are not complete, or which do not contain the application processing fee will not be considered by the scholarship selection committee.

Last year, individual scholarships ranged from $500 to $11,500, and the total value of the scholarships was $30,000. We anticipate that the number and total value of the 1986 awards will exceed the 1985 scholarship amounts. Each scholarship is for a specific school and/or a specific amount of money to be applied to a school.

Applicants are selected by the three members of the selection Committee based on factors related to financial need, prior experience, potential contribution to the Foundation's objectives, and overall merit.

Complete applications must be received by December 31, 1985. Selection will be made by February 15, 1986 and all applicants will be notified of the results by March 1, 1986. Scholarships will be presented at the annual convention of the International Association of Cooking Professionals in March 1986 at the J.W. Marriott Hotel in Washington, D.C. Attendance at the convention is desired but not required to be an award recipient.

Francois Dionot
Francois Dionot
Chairman of the Selection
Committee

Senator **Hecht**. Thank you very much. I asked if there was a time frame on everyone, and we are trying to ask you to hold it to 5 minutes, which you did, and I thank you.

And so we won't put a clock on you, but try and keep it as close as you can.

Terry Lash.

STATEMENT OF TERRY R. LASH, DIRECTOR, ILLINOIS DEPARTMENT OF NUCLEAR SAFETY, SPRINGFIELD, IL

Mr. **Lash**. Thank you, Mr. Chairman, for the opportunity to appear here today on behalf of Governor Thompson of Illinois. I am the director of the Illinois Department of Nuclear Safety and I am pending confirmation by the Illinois Senate, one of the three voting members of the Commission established by the Central Midwest Compact that Illinois has established with the Commonwealth of Kentucky.

Governor Thompson does wish that he could have been here today. He asked me to stress his strong personal support for passage of the Central Midwest Compact and S. 1578.

The State of Illinois urges the U.S. Senate to pass S. 1578 in order to make the necessary and equitable changes to the Low-Level Radioactive Waste Policy Act. The amendment to that act reflects a major compromise by the States with operating disposal facilities that is practical for all generators of low-level waste and fair to the nonsited States, such as Illinois. It should be acceptable to all of us.

In particular, I would urge that the volume levels in S. 1578 are reasonable and they should be supported. Higher ceilings are not necessary. If the pending compacts and amendments do not pass Congress this calendar year, there's the potential for chaos in the care of low-level radioactive waste management, potentially jeopardizing the State of Illinois' and other States' capabilities to assure public health and safety.

As a result, if these bills are not passed, the Federal Government would have to reassert itself and take full responsibility for the safe disposal of low-level radioactive waste.

Illinois and the other States that have worked hard and fruitfully for the past 4 years do not wish to see their efforts go for naught. Both the States and the Federal Government if the Senate does not act promptly to approve the compromise transition package which is embodied in S. 1578 and we must also simultaneously have ratification of the pending compacts.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Lash follows:]

AUG. 26th 1818

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DEPARTMENT OF NUCLEAR SAFETY
1035 OUTER PARK DRIVE
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TERRY R. LASH
DIRECTOR

STATEMENT

of

TERRY R. LASH

Director, Illinois Department of Nuclear Safety

Commissioner, Central Midwest Interstate
Low-Level Radioactive Waste Compact

Before the

SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT
COMMITTEE ON ENERGY AND NATURAL RESOURCES
and the
SUBCOMMITTEE ON NUCLEAR REGULATION
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

U.S. SENATE

October 8, 1985
Washington, D.C.

Mr. Chairman and members of the Committee. Thank you for the opportunity to appear here today on behalf of Governor James R. Thompson. The issue of low-level radioactive waste disposal is a matter of vital importance to the State of Illinois. My name is Terry R. Lash. I am the Director of the Illinois Department of Nuclear Safety, and I am, pending confirmation by the Illinois Senate, one of three voting members on the Commission established by the Central Midwest Interstate Low-Level Radioactive Waste Compact.

Governor Thompson wishes that he could appear before you today. He asked me to stress his strong personal support for passage of the Central Midwest Compact (S. 802) and the amendments embodied in S. 1578 to the 1980 Low-Level Radioactive Waste Policy Act that will provide for a practical, equitable transition between January 1, 1986, and January 1, 1993. This transition period is required in order for states to assure the establishment of new, safe low-level waste disposal facilities.

Governor Thompson is convinced that failure to ratify the Central Midwest Compact promptly and simultaneously to provide limited access to the existing disposal facilities for Illinois' and Kentucky's generators would jeopardize over four years of hard, fruitful work, and that such a failure of resolve by government would raise serious questions about whether low-level radioactive waste could continue to be managed safely. I cannot over emphasize the importance of swift action by Congress. The Nation faces a crisis in the near future if there is no resolution of the current impasse between sited and non-sited regions over access to the existing disposal facilities during the period between January 1, 1986, and the time when new disposal capacity will be available.

The State of Illinois fully recognizes that there cannot be "business-as-usual" in low-level radioactive waste disposal after this year. The volumes of waste shipped to the existing facilities must decrease beginning in 1986 and new permanent disposal sites must be developed as quickly as possible. These tasks must be accomplished in a way that is consistent with the highest possible level of protection of public health and safety and the environment. The State of Illinois fully supports implementation of a practical, safe and fair means for achieving the reductions in waste shipments that will meet the legitimate needs of the Northwest, the Southeast and the Rocky Mountain Compact regions, which have the only sites that can be used during the transition period.

During the past two years, representatives of the State of Illinois have participated in several meetings with officials from other states and regions, including those with operating disposal facilities, to consider a variety of issues and problems. The most recent discussions have focused on the basic concepts of interim access that would make up a so-called transition package. The basic concepts of this "tough but doable" compromise include:

- absolute volume caps at the three existing disposal facilities;
- continued access to existing sites during an adequate transition period that cannot be further extended;
- stiff, but reasonable, surcharges for disposal by producers of low-level radioactive waste in states and regions without disposal facilities;

- specific milestones which would indicate progress achieved in developing new disposal facilities; and,
- provisions for limiting further Congressional review of the compact system.

The negotiated compromise transition package, which is now embodied in S. 1578, would provide adequate incentives to the non-sited states and regions to develop disposal facilities as quickly and as safely as possible, and it would also provide adequate relief to the current host states during the transition period. Illinois finds the overall compromise package acceptable; recognizing that, as with any compromise, some parts are more palatable to us than are others. This compromise must be viewed in its entirety and not picked apart piece-by-piece. The most important part of this package to Illinois is, of course, the guarantee of an appropriate allocation of disposal capacity at the existing three sites.

The negotiated compromise transition package reflects an accommodation of the needs of non-sited states, by the sited states. The package is fair and practical. Further changes are not required. In particular, the ceilings do not need to be raised further. To attempt to do so would waste the negotiation process of the past two years and jeopardize the opportunity to solve an important problem--the safe disposal of low-level radioactive waste.

Representatives of the sited states, however, have indicated the level of surcharges on waste from states without their own facilities is still subject to negotiation. In that spirit we would ask Congress to consider reducing the surcharges by fifty percent, particularly in the early part of the transition period. Even after such a reduction, generators of low-level waste would still have strong incentives to reduce the amounts sent for disposal.

Most importantly, the State of Illinois strongly urges Congress to take swift action to approve a consensus transition package and simultaneously to approve of all of the compacts that have been introduced. The transition package needs to assure that the major producers of low-level radioactive waste, the nuclear utilities, make the most significant contribution to reducing volumes of waste shipped for disposal during the transition period. All utilities should be treated in the same manner regardless of the state or region in which they are located. Allocation schemes should be based on what can be most safely and practically implemented. Volume reduction requirements for non-utility producers of low-level waste are most efficiently and effectively handled by market forces rather than by government regulation. And finally, surcharges should be reasonable and should not simply transfer large sums of money from the non-sited to the sited states. Overall, these objectives are achieved in S. 1578.

The states face the prospect of a crisis in the very near future if there is no resolution to the interim access question. There are no easy or painless answers, but I believe that the negotiated transition package contained in S. 1578 is acceptable and practical. I hope that the Congress will agree and approve it swiftly.

Senator **Hecht**. Thank you very much.

Mr. Ray Peery.

STATEMENT OF RAYMOND J. PEERY, EXECUTIVE DIRECTOR AND GENERAL COUNSEL, CENTRAL INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMPACT COMMISSION, ATLANTA, GA

Mr. **Peery**. Thank you, Senator.

I'm here on behalf of the Central States Compact. We have testified before numerous committees on the Hill before and I will keep my remarks very short. We supported the implementation of the 1980 act, and have supported its implementation since.

We do recognize, however, that there is a need to amend that act to provide for instances that were unforeseen at the time of its passage.

The bill before your committee, we support in principle and we can live with the package. There are some specific provisions we would like to see changed, but if they're not changed, we're not going to die over it either.

I would like to comment on a couple of specific areas that we feel pretty dear to the heart, one being the surcharges. We recognize that basically what those surcharges are are a penalty to the other States that do not have anything in place yet and will require more time to site a facility. We can understand that concept. We are willing to pay the surcharge, or I should say we are willing to let our generators pay that surcharge. Ultimately the people pay it, of course. But we do see a need to rebate a portion of those surcharges back to the compact commissions, or in the instance where you have an individual State going it alone, so that we can go forward with siting and related efforts. The money should not be sent back to individual States or to the Federal Government.

The language that you have contains an emergency access provision, which in our view allows NRC to preempt compact authority. This is something that we find repugnant to the original intent of the 1980 act as far as export or importation provisions. We do not like that; we cannot support it. However, we recognize that there are those that must have it. And if that type of language has to remain in the legislation, we would support the legislation that is contained in S. 1578 or in language that came out of Mr. Udall's committee in the House.

We cannot support the language that came out of Mr. Markey's subcommittee in the House, nor can we support loosening the language in any way.

We support the milestone schedule that is contained in your language, and we would urge that this committee, as the legislation goes through the Senate, is kept stringent and that the penalties are stringent and that there is no weakening of the milestones or the penalties.

We also support the allocation system that is provided for, the interim access period. We would caution and urge that there be strict interaction between the sited and nonsited regions when it comes to determining which allocation goes where.

And, finally, we do urge that the Senate act quickly to get this legislation out so that we can go forward with the process of meeting our responsibilities.

Thank you, Senator.

[The prepared statement of Mr. Peery follows:]

TESTIMONY OF
THE CENTRAL INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMPACT COMMISSION

TO

THE UNITED STATES SENATE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
AND THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

HEARING ON
S. 1578
AND
AMENDMENT 583 TO S. 1517

October 8, 1985

By:

Raymond J. Peery
Executive Director and General Counsel

Mr. Chairman, members of the Committees:

It is my pleasure to appear before you on behalf of the Central Interstate Low-Level Radioactive Waste Compact Commission. We are pleased that the Committees are taking action to address the issues related to congressional consent to the compacts developed in response to the policy established by the Low-Level Radioactive Waste Policy Act (Public Law 96-573), and amendments to the Low-Level Radioactive Waste Policy Act offered by distinguished members of this body.

INTRODUCTION

The Central Interstate Low-Level Radioactive Waste Compact was developed in response to the policy established in the Low-Level Radioactive Waste Policy Act that placed responsibility for low-level radioactive waste disposal on the states. The compact has been ratified by five member states: Arkansas, Kansas, Louisiana, Nebraska, and Oklahoma. The Compact Commission organized and began performing its duties in June 1983. Since its organization, the Commission has established an office, hired staff, conducted a site exclusionary study, and requested congressional consent to the Compact.

The Central Interstate Low-Level Radioactive Waste Compact was introduced for consent in the 98th Congress in the form of H. R. 3002 and S. 1581. As the Committees are aware, the 98th Congress failed to consent to any of the compacts because of issues that remained unresolved between the parties at interest. During the 98th Congress, the Commission had the opportunity to address many of the issues relevant to the congressional consent process. The Commission addressed those issues in testimony before Committees of the House, and the Senate Committee on the Judiciary.

Because of our prior testimony and the record created during the 98th Congress, our comments on the congressional consent process in general will be brief. The Central Interstate Low-Level Radioactive Waste Compact has been introduced for consent in the 99th Congress. The legislation is sponsored by Mr. Glickman, et. al., in the form of H. R. 1046. Companion legislation was introduced in the Senate by Senator Dole, et. al., in the form of S. 655.

The Commission comes before you today and requests that members of the Committees support Congressional consent to the Central Interstate Low-Level Radioactive Waste Compact. The Commission understands that there are issues which remain unresolved that go to the heart of establishing a regional low-level radioactive waste management system. We are confident that these issues can be resolved in the form of amendments to the Low-Level Radioactive Waste Policy Act and specific consent language. We are in substantial agreement with the approach offered in the form of S. 1578 and Amendment 583 to S. 1517, and believe that the legislation provides the framework for addressing the issues which remain unresolved.

This Committee has requested that the Commission address specific issues relating to S. 1578 and Amendment 583 to S. 1517. We will now address those issues seperately.

SPECIFIC ISSUES

Post 1985 Disposal - Access to Existing Disposal Facilities and Allocation Levels.

The Low-Level Radioactive Waste Policy Act, as originally enacted, provides that a state with a disposal facility and that is in a compact which has been consented to by the Congress, may after January 1, 1986, refuse to accept waste not generated within its compact region. It is clear that on January 1, 1986, no new disposal capacity will have been developed. The three states presently "hosting" disposal facilities will continue to have the only disposal capacity in existence on January 1, 1986. Those same three states indicated in 1979 that they no longer intended to be the nation's low-level radioactive waste dumping ground. As an alternative to a threat of immediate closure of their facilities, they agreed to a grace period for acceptance of waste until 1986. It was assumed that new disposal capacity could be developed by 1986. However, the process of developing compacts, subsequent state enactment, congressional consent, and facility development has proven to be more time consuming than originally thought.

The three states with sites continue to make it clear that they must be relieved of the burden of being the nation's waste disposal sites. While it may be argued that these three states have the disposal capacity necessary to meet the needs of the nation for quite some time, it is not reasonable to expect them to continue to shoulder the entire burden of waste disposal indefinitely. The Congress recognized this principle when it enacted the Low-Level Radioactive Waste Policy Act.

As a result of the failure to develop new disposal capacity throughout the country, it will be necessary for the existing low-level radioactive waste disposal sites to continue accepting waste beyond January 1, 1986. A compromise must be reached between those regions and states without disposal sites and those regions with disposal capacity for the continued access to that capacity. We recommend that the Congress provide, by legislation, that the existing disposal facilities continue to accept waste from non-sited regions and states until January 1, 1993. This should allow for sufficient time to develop new disposal capacity throughout the country.

While we propose that the states with existing facilities continue accepting waste until 1993, we do not believe that they should be compelled to take one hundred percent of the waste being generated. The solution requires equity between all the parties. In order to alleviate the burdens of the states with existing facilities, which come as a result of continued waste acceptance, we agree that a "cap" should be placed on the amount of out-of-region waste that must be accepted at each facility.

We believe that the cap for each facility arrived at through negotiations between the sited regions, the non-sited regions and states, and the Congress is reasonable. There has been considerable discussion conerning the reasonableness of certain cap amounts.

Having concluded that it will be necessary for the existing facilities to continue accepting waste, and that a cap should be placed on the amount of waste to be accepted, it becomes necessary to establish a mechanism for assuring that the caps will be complied with. Specific legislation is necessary. S. 1578 provides the framework for such a mechanism.

The amount of waste shipped for disposal must be reduced if such a system is to work. There has been considerable discussion about methods of reducing the amount of waste shipped for disposal. One proposed solution is for generators to reduce the amount of waste necessary for disposal by incineration, compaction, or other technologies. It has not been determined how much of the waste stream can be reduced through these types of technologies. In addition, it is uncertain who would have the authority to enforce such reduction. Any legislation requiring reduction of the waste stream must provide for the authority to enforce the reduction requirements. If such reduction is to take place at the regional level, we request the Congress to empower the Compact Commissions to enforce the system.

It has also been proposed that commercial power reactors be required to store their waste on-site. Proponents of this solution argue that on-site storage by utilities represents a quick and identifiable method of reducing the amount of waste shipped for disposal. Surveys of the total waste stream indicate that such on-site storage could reduce the overall waste stream by approximately fifty-five percent. While on its face, on-site storage by utilites may be a quick and simple solution to the problem, it is also a very costly solution. The utility companies within our region have indicated that the cost of developing on-site storage at each reactor is between four and six million dollars. This cost does not include the costs associated with ultimate disposal. In addition, at the end of the on-site storage period, each utility will have a significant amount of waste that will have to be disposed of at a newly developed regional facility. This may create a burden on the facility operator not originally anticipated.

The utility companies in our region have indicated that they do not favor on-site storage as a solution to the issue of reducing the waste stream. They are, however, worried about the prospect of not having disposal capacity after 1985. For this reason, some of the utilities in our region have developed plans for on-site storage of their waste. These plans should not be misinterpreted to indicate their support for the on-site storage alternative. Our utilities have indicated that they would prefer the alternative of waste reduction through technology.

The Commission has examined both alternatives for reducing the waste stream. Economically, it appears that reduction through technology may be the preferred method for large generators. The costs associated with reduction may cause hardship on the smaller generators that are not financially capable of funding such technologies. In addition, we have not yet heard arguments that alleviate our concerns regarding enforcement mechanisms.

The alternative of on-site storage by utilities would be costly to the utilites and ultimately their rate payers. This does not, however, dispel the argument that this solution would be quicker and more efficient to implement than any other. It may be that some combination of storage by large generators and reduction by medium sized generators can be achieved, and result in a solution that is acceptable to the generators and the sited regions.

We caution that provision should be made for the continued access to disposal capacity for utility waste.

The primary concern of the generators is that they are assured of continued disposal capacity. The sited regions are concerned that new disposal capacity is developed in a timely manner. We recommend that any solution to the post 1985 disposal issue provide that non-sited regions and states develop a siting schedule that establishes specific time tables and milestones. Such schedules should address the concerns of the generators and sited regions. It must be emphasized, however, that the schedules can not be subject to unwarranted delay. One deadline has already been missed. If the system is to be creditable, a final deadline must be established and complied with.

The solution mandated to reduce the waste stream must take into consideration the need to minimize the cost to generators. For their part, the generators of waste must realize that it is their waste we are attempting to find disposal capacity for. They must be willing and able to do their part to solve the problem so that new disposal capacity can be developed. These issues have been discussed for the past four years. It is time for the Congress to enact appropriate legislation. We can ill afford to continue debates that provide no solutions. We believe that the proposed legislation reflects a reasonable solution developed through discussions between the parties at interest.

Proposed Disposal Surcharges.

The Commission agrees that the three states with existing disposal facilities should be compensated for continued acceptance of waste. However, the surcharges currently proposed are excessive. In addition, a portion of the surcharges collected by the three states should be rebated to the Compact Commissions for the purpose of furthering site development.

Projected Disposal Requirements After January 1, 1986.

In 1983, generators from the five states of the central states region shipped 65,738 cubic feet of waste for disposal. Approximately ninety percent of the waste volume is generated by the utility industry. By 1986, the region will have three new operating commercial power plants. As a result of the three new plants, the region will be generating an additional

75,000 cubic feet of waste. It is estimated that by the end of 1986, the region will be generating approximately 160,000 cubic feet of waste annually.

Schedule for Developing Disposal Capacity.

The goal of the Commission is to have disposal capacity available to generators of the region by 1991. Toward that end, the Commission has conducted a site exclusionary study. The study identifies those areas within the region that cannot be licensed as a site for low-level radioactive waste disposal. Plans call for a second phase study that will examine those areas which have not been excluded, and would also develop a management plan for the region. The second phase study is contingent upon receiving funds from the Department of Energy. If funds are not forthcoming from the Department of Energy, the progress of the Commission will be significantly curtailed. It would become necessary to secure funding from other sources, a prospect that is not very promising. Discussions with DOE are continuing.

Following the conclusion of the second phase study, the Commission anticipates being prepared to request bids from potential disposal facility developers. Under the terms of the Compact, the Commission will review the bids it receives, and select an acceptable bid that is best suited to meet the needs of the region. This should occur by the end of 1986. Following the Commission's action, the burden will be on the potential developer to file a license application and proceed with site development. Assuming no major delays in the development process, it could be possible for the facility to be constructed and licensed by 1991.

This schedule assumes a number of factors favorable to site development. First, sufficient funds must be made available from the Department of Energy to conduct siting studies. Second, the Congress must consent to the Compact in 1985. Failure of the Congress to consent will prevent the Commission from taking those steps associated with selection of a potential developer and site. Third, an acceptable proposal to develop must be presented to the Commission. Finally, no action is taken to significantly curtail the licensing process.

Any deviation from these assumptions will cause a deviation in the Commission's schedule. While the Commission pledges to fulfill its responsibilities in a diligent and timely manner, we cannot make guarantees conerning matters or actions over which we have no control.

Congressional Consent to the Compacts.

The Commission requests that the Congress consent to the Central Interstate Low-Level Radioactive Waste Compact. Because our region does not presently have a disposal facility that we can prevent others from using, we believe the Congress should consent to our compact without reservation. The consent of Congress to our compact is necessary if we are to go forward with our siting schedule. By consenting to the

Compact, the Congress is furthering the goal of establishing the regional low-level radioactive waste management system envisioned by the Low-Level Radioactive Waste Policy Act.

With regard to other compacts presently before the Congress for consent, the Commission believes that the Congress should grant its consent to those compacts. The consent of the Congress should, however, be contingent upon the amendments to the Low-Level Radioactive Waste Policy Act previously discussed.

Impact of the Failure of the Congress to Consent to the Compacts.

As stated earlier, failure of the Congress to consent to our compact will hinder our site development schedule. Failure of Congressional consent will also leave the regions in an uncertain position regarding siting efforts, disposal access guarantees, and overall waste management policy. Furthermore, the three states with existing disposal facilities would probably conclude that failure by the Congress to consent to the compacts indicates an unwillingness to allow the regional waste management system to go into effect.

It is not inconceivable that under such circumstances, the three sited states would take steps to close their facilities. Such actions on their part would create an atmosphere of distrust and fear that disposal capacity will not be available to generators. The result could be a solution borne out of panic, and not one that is rational and capable of surviving the test of time. We believe that a regional waste management system, developed by and managed by the states, is the most efficient and workable system.

Alternatives to State Responsibility.

In 1979, the three states with existing disposal facilities made it clear that the present system for low-level radioactive waste disposal was not acceptable. The Congress, in 1980, accepted that view when it enacted the Low-Level Radioactive Waste Policy Act. The Act established a federal policy of state responsibility in the area of low-level radioactive waste management. The states of the central states compact region did not quarrel with that federal policy, but instead worked diligently to develop the Central Interstate Low-Level Radioactive Waste Compact. The central states have taken the responsibility established by the 1980 Act seriously.

We believe that the Congress should not consider alternatives to state responsibility and the interstate compact system as a mechanism for low-level radioactive waste management. Throughout our history, states have joined together to develop solutions to problems. Problems, large or small, are not resolved overnight. Instead, lasting solutions come about only after careful consideration, deliberation, and consensus between the parties. The states have had the opportunity to discuss the great many issues which relate to low-level radioactive waste management. Perhaps it was unrealistic to assume that the states could meet their responsibilities in the area of waste management by 1986. This is not to say, however, that the states cannot meet their responsibility. We believe that with the assistance of the Congress, solutions to the issues raised can be presented as legislation this year. With the issues resolved, the states can go forward with the process of meeting their responsibilities.

The states should not be penalized for failing to meet their responsibilities in a time frame that was not realistic. The Congress should allow the regional waste management system to take effect and operate as anticipated. The states should not be denied the opportunity to make the system work.

CONCLUSION

While there is a need to change some of the specifics in the legislation before you today, the Commission supports the majority of the language and is committed to making the system work. Through the diligent efforts of all concerned, specific issues can be resolved and Congressional consent should be granted this year. We respectfully request that this Committee take a giant step toward putting the regional waste management system into effect by granting a favorable recommendation to S. 1578.

Senator HECHT. Thank you very much.

Mr. Peery, are surcharges an incentive for opening new disposal sites before the 1992 deadline?

Mr. PEERY. They can be seen that way. It depends on how much a particular region's generators are having to pay out as to whether they put pressure on the compact commission of that region to develop the facility.

Senator HECHT. Mr. Lash, can utility generators achieve far greater volume reduction than required by this bill?

Mr. LASH. I don't know that they could obtain far greater volume reduction, but they can have success in a number of ways in reducing volume. In Illinois there is one major utility that has undertaken a program to reduce by over 50 percent the amount of waste it produces, and those technologies are cost-effective today.

Senator HECHT. Mr. Peery, are the emergency exemption provisions reported by Mr. Markey's subcommittee in the House adequate or too loose? Do you prefer Mr. Udall's approach to emergency exemption?

Mr. PEERY. We would prefer Mr. Udall's approach.

Senator HECHT. Thank you.

If we were to find that more time must be allotted to the licensing phase of site development, could this be achieved by shortening the timing allotment for the first two milestones?

Mr. Paton, do you want to address that?

Mr. PATON. Mr. Chairman, no, I don't believe it could. I think most of the compact commissions are operating on as rapid a schedule as possible. In the Midwest, for example, we see it's going to take at least a year to a year and a half to actually through a very detailed site screening activity on the part of the selected host State.

In the Midwest Compact, we also are required by compact condition to prepare a comprehensive waste management plan, which we're 50 percent of the way completed right now in doing, and there's absolutely no way that we could speed that process up any greater than what we have.

Senator HECHT. How do you envision monitoring the adherence to milestones? Who should administer and enforce such work?

Who would like to address that?

[Pause.]

Senator HECHT. Most people are looking at you, Mr. Lash. That must be your question.

Mr. LASH. That's the problem with being in the middle of this table.

Well, personally, I think that all the States are acting under good faith and I don't think it's going to be a critical problem in telling whether progress is being made or not. Ultimately, the States with existing disposal facilities hold the cards and they're going to look very carefully at what all the compact commissions and all the host States or selected States are doing, and I think that ultimately they're going to have to be responsible for seeing that the milestones are met and make those judgments.

Senator HECHT. Thank you.

Each of the compacts now before Congress contains a severability clause that allows any provision of the compact to be severed if it is contrary to the Constitution or some Federal or State law, without invalidating the remainder of the compact provisions.

With that clause in mind and considering the provisions of S. 1578 to preserve the Federal Government's jurisdiction, do you foresee of any circumstance under which these compacts would have to be sent back to the State for reratification?

Who would like to take that?

Mr. Paton.

Mr. **Paton**. I think, Mr. Chairman, that if there are substantive changes to the compacts themselves, the principles upon which they are built, I think that would cause many of the States to reexamine the rationale and the purpose by which they had initially enacted State legislation and at that point I think many of the States would insist on that compact going back before State legislatures for reenactment.

Senator **Hecht**. Thank you.

Would further technical assistance from DOE significantly reduce the time required to develop a disposal site in your State?

Do you want to answer that, Mr. Peery?

Mr. **Peery**. I'd be happy to. Yes; we believe firmly, opposed to what DOE said earlier today, that the Department of Energy should continue to provide both technical and monetary assistance to the compact commissions. It would help our process along significantly to have their assistance. We've had it to this date and we would like to continue receiving it.

Senator **Hecht**. Thank you.

Do you think that rebating surcharge funds back to the State through DOE grants and assistance, rather than directly back to the State, would provide a greater assurance that the money would be applied where it is needed the most?

Mr. **Paton**. Mr. Chairman, if I may, since we have made surcharges one of our major issues, our idea on the surcharge rebates would be that the moneys either be set aside as part of a national fund to be administered through the Department of Energy or some other entity, or in absence of that, the moneys should be rebated to the commissions.

I think the commissions are in a position where they could collectively take that money and apply that where it's necessary for the siting activities and the site development activities.

I think just simply rebating it to the States poses some very serious problems in that—I can give you an example. If we selected an individual State as a host State, even though the money was returned to that State, that State would have to go the legislature and now say, please allocate us the funds for siting. And that, I think, would be a very difficult task.

Senator **Hecht**. Thank you.

Mr. **Lash**. Mr. Chairman, would you mind if I responded to that, as well?

Senator **Hecht**. The more input, the better for the hearing.

Mr. **Lash**. The position of Governor Thompson is that it's preferable to reduce the size of the surcharges rather than have any particular rebate scheme. I think there is sufficient financial incentive today, even without surcharges, that both the utility generators and the nonutility generators are doing everything technically feasible to reduce the amount of waste that they produce and that is necessary for shipment.

And then I think the surcharges punish the generators unnecessarily, particularly in their early years when it's just impossible to do any more.

If, however, the surcharges remain at the current level, and there is the possibility of rebate, we would prefer that those rebates go to the State of Illinois rather than the commission. The State is responsible for the siting of an advanced facility and it is where we have good support from both the General Assembly and from the Governor as the Department of Nuclear Safety, and we would much prefer to have the money directly go to the agency that has to see that the job gets done.

Senator HECHT. Do you want to respond to that, too, sir?

Mr. PEERY. Oh, sure. I would remind the committee that the State of Illinois is in a very unique position. We would find it very difficult to have the money go directly to our individual States. We'd never get the money out of legislatures back to the compact commission.

It would be difficult to take the State legislature and convince them that they need to fund a lot of money that they could be spending elsewhere to dig a hole to put low-level waste in some place in their State. It would not be feasible in our region to do that.

Senator HECHT. I like these noncontroversial questions.

What kinds of local incentives does your region plan on using to gain greater public acceptance of a low-level waste facility in that particular community?

Would you start off?

Mr. PATON. Certainly, Mr. Chairman. This is an area that we have been looking at very closely. In fact, much of the work of our management plan is investigating local incentives and State incentive programs. Much of that may be financial incentives, but again the commission has limited resources at this time, and it would be one of the items that I think some of the rebate funds could be put to very positive use.

Senator HECHT. Anyone else want to address that?

[No response.]

Senator HECHT. Mr. Lash, the Central Midwest Compact prohibits the shallow land burial of waste. How did this compact region figure that an alternate disposal method woul be developed in time to meet the deadline, considering that we neither have the alternative method defined nor the licensing criteria identified by the NRC?

Mr. LASH. Well, we like to think the State of Illinois is unique in many regards. I'd point out that I think the State of Illinois was only the first to effectively ban shallow land burial, and that that's the process that's taking place throughout the country now.

There are designs in existence, and in fact they've been informally presented to the Department of Nuclear Safety, on alternatives to shallow land burial. I think there's going to be no shortage, in fact, of new techniques. And, in fact, improved technology has been used in other parts of the world for quite some time, such as in France, Sweden, Switzerland, Germany, and so on.

We're having a major international meeting in Chicago at the end of February where both domestic companies and representatives of these European technologies will present their experience and their ideas to us, and I hope State officials from around the country. And I think as will be clear at that meeting, there is a long list of technologies to choose from and improve upon.

Senator HECHT. Mr. Lash, you have requested that the Congress consider reducing the surcharges by 50 percent in the early part of the transition period.

Would you elaborate on the impact of such a reduction in relation to incentives? And why would a 50-percent reduction still be a strong incentive for the generator to reduce the amount of low-level waste sent for disposal?

Mr. LASH. Well, the disposal charges today are already a lot higher than they were just a few years ago. When you include transportation from Illinois, it's about a minimum of $30 per cubic foot and a lot higher. As a result of those recent increases in the basic charges for disposal, generators in Illinois are already sustantially reducing the amount of waste that they produce, and from the plans that they have submitted to us on an annual basis, it's clear that the volumes of waste that Illinois generators are going to produce will continue to go down.

We're way below the Federal Government's projections for our State, and I suspect that that's true around the country. I don't think that surcharges, particularly for the next couple of years, are going to make any difference in the volume of waste that's going to be sent for disposal.

Senator HECHT. Thank you very much. No further questions, so we'll go on to Panel No. 8.

Senator HECHT. Excuse me. Has Governor Gardner arrived yet? [No response.]

Senator HECHT. If the Governor is not in the audience, then we will proceed with Panel No. 8. Mr. J.J. Scoville.

STATEMENT OF JOHN J. SCOVILLE, PRESIDENT, U.S. ECOLOGY, INC., LOUISVILLE, KY

Mr. SCOVILLE. Senator Hecht, thank you, and I thank the members of the committee for inviting me here. It's a pleasure for me to once again present industry testimony from the operator's point of view.

U.S. Ecology is the operator of two of the three commercial low-level waste sites in the country today. We have consistently supported the implementation of the compact, as defined in the Low-Level Waste Policy Act, and at this time we have worked diligently for the existence of the bill currently, as it's reported out of the Interior Committee in the House, and we want to present additional testimony in support of that concept here today.

We have testified before that House Subcommittee on Energy and Environment and the Energy Conservation and Power. Our support is based on the firm belief that we need to make a transition to a regional compact system without disturbing a safe and efficient national system of low-level waste disposal in this country and avoid needless and not practical interim storage kinds of devices in the various regions.

Today, we've been asked in our testimony to speak directly to the question that was discussed this morning considerably in this committee, that aspect of dual regulation and the mixed waste question. We believe that clarification needs to be made, and the best vehicle to make that clarification is the current legislation under consideration.

Clarification is necessary because at the moment, operators of low-level waste repositories are faced with the specter of dual regulation from the EPA and from the NRC under two bodies of regulatory schemes which are inconsistent and in conflict.

We think that that very conflict is extremely germane to the implementation of regional compact, because in the interest—it is certainly the stated interest of the three sited States currently to see that regions currently not having sites develop such sites. And I can tell you, speaking as an operator of these facilities, such sites will not be built until these regulations are straightened out.

We wouldn't know how to build a site today because we wouldn't know whether we'd build them according to RCRA EPA regulations or NRC Part 61, and industry cannot risk capital in that magnitude without some clarification as to what regulations will finally exist.

We realize that this mixed waste question goes farther than just regional compacts, but we believe that this is the proper vehicle to straighten it out, since it does impact directly on the regional compact system.

We're well aware of the concern in the medical and industrial and utility industry, and in order to focus attention on this mixed waste question, let me just tell you that my company has announced recently that as of October 28, we will be unable to dispose of certain scintillation vials contains toluene and xylene at our Richland, WA facility, and that up until this time, and currently, there is no other place that the generators of this waste can dispose of their contaminated material.

We are forced into that. We don't just cut off our business without some consideration. We're forced into that because there's a November 8 date mandated in RCRA which requires that by that time, we must have submitted a part B application for a facility if it's to be RCRA-regulated, or we must submit a closure plan.

Since we cannot meet RCRA criteria in the part 61 site, we have to submit the closure plan and, therefore, not take this material anymore.

We believe that the question goes considerably farther than just a concern over the scintillation vials, the toluenes and the xylenes. There have been studies made by Brookhaven National Laboratory, commissioned by the NRC, to identify whether there were in fact RCRA hazardous materials in low-level waste products. These studies, while still in draft, indicate that there might very well be considerable more RCRA-controlled material, strictly speaking, interpreted by the RCRA criteria, in many of the other low-level waste streams that we currently receive at our facilities and at the other facility that's not operated by us.

This recent Brookhaven work indicates that contaminated lead shielding cannot pass the EP toxicity test that makes it therefore subject to RCRA control; that spent resins from demineralizers contain toxic materials, including heavy metals that would qualify as RCRA-controlled material. Other things, such as chemical solvents, cleaning solutions, chelating agents, chromic acids that are used for corrosion inhibitors, these are all RCRA-controlled substances currently going to the low-level waste land fills in South Carolina, Nevada, and Washington.

If this conflicting regulation is not straightened out, then strictly speaking, all these facilities should be closed on November 8, because that's the mandated RCRA law

I hope that we, as a government and as a society, have more sense than that, but it does need to be straightened out. Some of the background here is that in 1980, U.S. Ecology requested clarification from EPA on this problem. We had submitted a part A application under RCRA because, according to our interpretation of the law, it was a requirement.

It took until 1983 before EPA and NRC finally entered into dialog and agreed to develop a memo of understanding to resolve the matter. Then came the passage of the reauthorization of RCRA, and at that time language was included in the Reauthorization Act which, according to EPA, made it impossible for them to continue the memo of understanding discussion, and so all talk has now stopped.

My company has been requested to submit its part A application for its Washington facility. The problem with two masters is not just that; the problem is that the body of regulation are in conflict; that RCRA has requirements for inspection and verification of the waste material, whereas NRC requires that you not open the container. You can't do both. It's a conflict that needs to be resolved.

There are other areas of such conflict. The basic philosophy is different in that the RCRA philosophy is always toward eliminating land fills ultimately because they're not desirable under RCRA, whereas NRC Part 61 starts with the premise that the land fill, properly designed, engineered and operated, is a correct way to handle our radioactive waste problem.

With those differing philsophies at the outset, it's not surprising that conflicts in the detailed regulations indeed exist. We think that there is a solution to the problem and it's not what we wanted initially. It represents a compromise on the part of the industry with those associated with other aspects of the passage of this bill.

Congressman McCain proposed an amendment to House bill 1083 which we believe is workable. It's difficult but it's still workable. It allows for EPA and NRC to identify the substances subject to this dual control and then it allows for EPA to promulgate regulations which then they will authorize NRC permitting authority. I think it's a workable situation. It does take advantage of the EPA expertise in hazardous chemical wastes and the NRC's expertise in low-level radioactive waste.

This is the primary message that I want to bring to you today. I have also listened with considerable interest to the discussion of alternative technologies to shallow land fill. I would like to point out that such alternative technologies are currently available. This morning there were some discussions as to whether various agencies' R&D budgets were sufficient to accommodate these alternative technologies.

As an operator, I think my people and I are quite up on the state of the technology, and I can say without doubt such alternatives are currently available. And this would include a vault-type facility such as shallow land burial, but done in an engineered facility with concrete or other kinds of engineered capability. My company, as well as others, have such designs already.

Incineration is a volume reduction technique, that instead of putting 40 drums of low-level waste in the land fill, you put one drum of ash. My company is attempting to license such a facility in North Carolina at the moment.

The other technology that's currently available is that of the super-compacter, where volumes again are reduced by large factors so that less shallow land fill burial capacity is needed for the same volume of radioactivity.

Thank you, Senator.

[The prepared statement of Mr. Scoville follows:]

TESTIMONY OF

JOHN J. SCOVILLE
PRESIDENT

US ECOLOGY, INC.

before the

SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
AND THE
SUBCOMMITTEE ON NUCLEAR REGULATION
SENATE COMMITTEE ON THE
ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE

Washington, D.C.
October 8, 1985

US Ecology, Inc.
9200 Shelbyville Road
Suite 300
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Mr. Chairman and Members of the Committee,

My name is Jerry Scoville, I am President of US Ecology, Inc., a company that operates two of the Nation's three commercial low-level radioactive waste disposal sites, one near Beatty, Nevada, the other on the DOE's Hanford Reservation in the State of Washington. I appreciate very much the opportunity to testify this morning on S.1517, a bill to amend the Low-Level Radioactive Waste Policy Act of 1980.

Our company has over 25 years of experience in managing low-level radioactive waste and has been intimately involved in the regulatory processes governing this type of material. We have also been closely following the development of the compact legislation as it moves through both the House and Senate and have made our support for the concept of regional compacts known to the House Subcommittee on Energy and the Environment and the House Subcommittee on Energy Conservation and Power, as well as the Senate Judiciary Committee. This support is based on our desire for the continuance of a uniform national low-level radioactive waste disposal system which will insure the safe, proper, and timely disposal of such waste.

We have been asked specifically to comment today on the dual regulation of low-level radioactive waste facilities by both the NRC and the EPA. I am pleased to do so.

It is our view that the dual regulation of LLRW facilities by the NRC and EPA threatens the enactment of the regional compact system (Exhibit A) for it presents potentially unresolvable difficulties for present and future site operators. In addition, recent events have forced this issue to become of grave concern for medical generators and perhaps to industrial and utility generators as well.

The Impact of Dual Regulation

Without timely resolution of the dual regulation issue by the Congress, the following could occur.

- As of October 28, 1985, US Ecology will be forced to stop accepting some medical wastes (scintillation vials) for disposal at its

Richland, Washington, facility. We are the only land burial disposal source for these radioactive materials. We have already notified our customers of this cutoff.

- As of November 8, 1985, the presently operating low-level radioactive waste sites (Beatty, NV; Richland, WA; Barnwell, SC) may be forced, depending on the extent of the EPA's definition of mixed waste, to stop accepting a substantial amount of waste they currently receive for disposal.

- New site development and construction could be delayed or totally frustrated unless the regulatory conflict is resolved.

Background of the Dual Regulation Problem

As you may know all commercial low-level radioactive waste sites dispose of wastes regulated under the Atomic Energy Act of 1954, as amended, as well as naturally-occurring and accelerator-produced wastes. Some of these wastes may contain small quantities of hazardous chemical waste which are regulated by the EPA under the Resource Conservation and Recovery Act (RCRA) of 1976. For example, some scintillation vials containing radioactive material used by medical profession may also contain small quantities of toluene and xylene.

In 1980, this situation was brought to the attention of the EPA by US Ecology. We pointed out at that time the need for a single regulatory agency (the NRC) to regulate all radioactive materials buried at the low-level radioactive waste disposal sites. We also requested clarification of the regulatory program governing the disposal of those wastes that consisted of both NRC and EPA regulated materials.

In 1983, almost three years after the problem was brought to the attention of the EPA, the EPA advised that the Agency was in the process of developing with the NRC a Memorandum of Understanding (MOU) with respect to these wastes. The MOU was necessary as the NRC regulations (10 CFR Part 61) and the EPA regulations (40 CFR Part 264) contained serious differences in both approach and design in regulating a land disposal site, even though both agencies have the same goal in mind--the protection of the public health and safety (Exhibit B). For example, RCRA requires waste verification analyses; the NRC discourages such a program due to personnel exposure to radiation. The NRC's CFR Part 61 regulations discourage leachate collection systems; RCRA requires leachate collection systems at chemical waste disposal sites. However, the EPA has taken the position that the 1984 amendments to RCRA preclude any further work on arriving at a MOU with the NRC and is requiring that an application for a RCRA Part B permit be filed for the Richland, Washington, facility no later than October 1985. In short, it is the intention of the EPA to regulate the existing low-level radioactive waste sites even though the EPA's regulations differ significantly from those of the NRC.

The problem is compounded in that the EPA may not only be looking at mixed medical wastes (scintillation vials) but other wastes as well that may contain some RCRA wastes; for example:

- radioactive contaminated lead shielding;
- resins containing toxic metals;
- filter media; and
- chemical solvents, cleaning solutions, chelating agents, and chromic acids.

Further, the Washington State Department of Ecology (WDOE) has indicated to US Ecology that it too is not only concerned with the regulation of scintillation vials under RCRA, but is looking at a whole spectrum of waste which may encompass the majority of waste streams received at the Richland, Washington, facility.

In 1980, US Ecology filed as a protective measure a RCRA Part A permit for both its low-level radioactive waste disposal facilities. It is the only company operating shallow land burial facilities to do so. Should the RCRA regulations be interpreted to extend to this broader spectrum of wastes accepted at the low-level waste sites, a site which has not filed a Part A permit application could be forced to shut down prior to the November 8, 1985, the deadline for having filed a Part B application.

It has been and continues to be the company's position that there already exists a stringent and comprehensive regulatory framework which regulates the low-level radioactive waste disposal sites for the protection of public health and safety.

In addition, such a regulatory conflict, if not resolved, will undoubtedly delay and frustrate new siting attempts. This conclusion is borne out by the fact that RCRA regulations are designed to discourage and even eliminate new landfills whereas the NRC has found that a low-level radioactive waste site constructed pursuant to 10 CFR Part 61 of its regulations is an acceptable method of disposal.

The Dual Regulation Solution

After it became obvious that a MOU was not going to be developed between the two agencies and, indeed, that legislative relief was needed to resolve the problem of dual regulation, US Ecology intensified it efforts to bring the problem to the attention of Congress within the context of the pending compact ratification or consent process.

We originally proposed an amendment which would have given sole regulatory authority at the commercial low-level radioactive waste sites to the NRC. However, in order to assure speedy passage of the compacts, a compromise amendment was forged to take into consideration the position held by some that the EPA's expertise in hazardous chemicals should not be overlooked when considering regulating materials with both chemically hazardous and radioactive consitutencies. The compromise amendment was passed at the full committee level and attached as Section 13 to H.R. 1083 which is the legislative consent vehicle recently reported out of House Interior and Insular Affairs committee.

The amendment offered by Rep. John McCain (R-Ariz.) provides for the following (Exhibit C):

- o Within 90 days of enactment of the compact legislation, the EPA Administrator with the concurrence of the NRC shall identify a list of substances disposed of at commercial low-level radioactive waste sites which should be subject to EPA regulation.

- No later than 12 months after enactment of the compact legislation, the EPA will promulgate regulations in regard to the treatment, handling, disposal, or monitoring of the listed substances.
- The EPA Administrator shall enter an agreement with the NRC delegating the NRC permitting authority under RCRA.
- Twelve months after the date of enactment of the compact legislation, the three current facilities must be in compliance with the interim status regulations of the 1984 RCRA reauthorization amendments.

While the company has had to accept this approach, it does not solve the entire problem. Even twelve months after enactment, there may still remain dual regulatory conflicts. For example, waste analyses requiring testing for both chemical and radioactive substances could create problems for the regulated community.

Further, the compromise will result in future disposal fees being increased to offset more expensive construction and operating costs due to the inclusion of EPA regulations at the commercial low-level waste disposal sites.

The low-level radioactive waste disposal industry and the medical profession cannot serve two masters. If the Richland facility is forced to close its doors to scintillation vials on October 28, 1985, which now appears necessary because it cannot operate under conflicting regulations, the medical profession may have to store its mixed waste for an indeterminate but apparently long period of time. Another alternative would be to discontinue the use of scintillation vials in the practice of nuclear medicine. Should this happen, it could be a serious setback for the medical and research communities. Should the EPA extend the mixed waste issue beyond scintillation vials, the consequences to the low-level radioactive waste generators are even more severe.

The NRC in conjunction with Brookhaven National Laboratory is currently evaluating chemically hazardous low-level radioactive waste to determine the extent to which the EPA's 40 CFR Part 264 hazardous waste regulations may be applicable to commercial low-level radioactive waste. The preliminary results of this investigation will be completed in October. This study can provide guidance to both agencies in determining what materials should be considered "mixed waste" and how those materials should be handled in the regultory framework currently envisioned by the Congress.

It is because of this situation that we urge this committee to help avoid what is a national problem. Economy alone dictates that there should not be two agencies with the same goals in mind regulating the same entity. Further, in view of the fact that the majority of the waste will be radioactive, it makes considerable sense to give the NRC the regulatory responsibility for the safe disposal of these mixed wastes.

Mr. Chairman, I would now like to turn to other issues of concern to US Ecology with respect to S.1517, as amended by Senator Thurmond's bill (Amendment S.583).

Volume Allocation Limits

There are some sites contained on the Superfund's National Priority List which are contaminated with low-level radioactive waste. Should the EPA desire cleanup of these wastes by removal and disposal during the transition period, it is unclear to us how these wastes will be handled under the compact legislation.

Exclusionary Date

The December 31, 1992, exclusionary date is a realistic one only if the host states are selected earlier than 1988, the date provided for in Amendment No. 583 to S.1517. This conclusion is based upon the belief that the site selection process, including licensing, public hearings, possible litigation, and construction, can take up to six years, and in any given situation could go well beyond that time interval. However, if the prospective site operator is given until January 1, 1990 to file an application with the NRC or appropriate agency in an agreement state, the three-year period between January 1, 1990 and December 31, 1992 would not be a sufficient time interval to complete the licensing process and have a site in operation by January 1, 1993. Should RCRA permits be required, the December 31, 1992 deadline may be impossible to meet.

Volume Reduction

US Ecology receives the majority of commercial low-level radioactive waste generated in the United States. At the time of receipt at the disposal site, it is not always possible to determine what volume reduction methods, if any, were used to treat the waste at the point of generation. However, we are confident that many generators are already using compaction or other techniques such as waste segregation, better decontamination activities and short-term storage for decay to reduce volume. This conclusion is fortified by the fact that the total volume of waste delivered to both US Ecology disposal sites has remained essentially static over the past three (3) years even with new nuclear power reactors and other industrial facilities coming on-line. With a volume allocation program in place at the Barnwell, South Carolina, disposal site, one would reasonably expect any increase in waste volume due to additional generators to be reflected at the other disposal sites which are operated by US Ecology. However, since this increase has not materialized, we must conclude that a significant amount of waste is undergoing various volume reduction techniques.

Requirement for Access

We are concerned with the provision in Amendment No. 583 to S.1517 that incorporates deadlines for continued access to currently operating facilities. While we support establishing specific siting goals such as a non-sited compact selecting a host state, etc., we would prefer that arbitrary or artificial deadlines not be made a part of the legislation other than the December 31, 1992 date. Failure to meet an arbitrary date, if only for a few days, can result in a non-sited compact region or non-member state being denied access to the presently operating facilities. However, realizing the political necessity for compromise, we recommend a system such as that proposed in H.1083, as reported out of the House Interior and Insular Affairs Committee.

Surcharges

We believe that surcharges can provide meaningful incentives if properly applied. The proposed bill provides that surcharges shall not exceed in 1986 and 1987 $10 per cu. ft. of low-level radioactive waste. This figure is then raised to $20 in 1988-89 and in 1990-92 to $40 per cu. ft. We believe that as a region gets closer to accomplishing its goal of having an operating site by

January 1, 1993, they should be rewarded by a reduction in the surcharge, not penalized by an increase. In short, US Ecology recommends, for those regions meeting their milestones, at least reversing the charges, imposing the highest fee in 1986-87 with the smallest fee in 1990-92 if not returning the fees to their state of origin.

We must remember that while these larger fees may be more easily absorbed by the utilities and larger industrial concerns, they are going to be a significant burden to the medical community and other smaller waste generators. It must also be remembered that the generators are not the primary developers or regulators of new sites--the states are.

Agreement to Allocate Waste

One of the provisions contained in Amendment No. 583 to S.1517 would require the three states in which there are presently located regional disposal facilities to agree within a period of three months as to what method or methods are to be used for the division of wastes among the sites.

In order to supplement this system, we recommend that US Ecology, in conjunction with Chem-Nuclear, establish a joint computer system which would keep track of the volumes of waste being disposed of at the three sites, a system already in place at each site. This ought to provide sufficient and important information to the three sited regions.

Adequate Disposal Space Past the Year 2000

As we address the political necessity for regional disposal, we should remember that the nation's three present low-level radioactive waste sites can accommodate all of the nation's commercial low-level radioactive waste well past the year 2000. Existing disposal capacity at the three sites is estimated as follows: 10 million cu. ft. at the Barnwell, South Carolina site; 13 million at the Beatty, Nevada site; and over 40 million at the Hanford, Washington site. Our projections indicate that there will only be a need for some 50 million cu. ft. of disposal space through the year 2000. (Exhibit D) Thus, if political considerations could be discounted, there would be no need for an interim allocation system.

Temporary Storage Should be Discouraged

Temporary storage during the period from January 1, 1986 through December 31, 1992 will involve duplicate handling and negative public health and safety implications. It should be discouraged. Proliferation of temporary storage facilities will involve unnecessary costs and will strain existing regulatory oversight capabilities. Since there is more than adequate disposal space at the existing sites, such storage should be kept to a minimum.

New Sites - The Economic Picture

While there is a future need for new site development, we now appear to have the potential for developing at least ten new sites. Such proliferation should well be a cause for concern. The multiplicity of sites which are evolving under the compacts may not be self-supporting based solely on waste receipts. If all ten proposed compacts are established (Exhibit A), disposal fees will have to be considerably higher to maintain the economic viability of the new sites. It is estimated that it will cost from $6 - $10 million to construct and license a new site (and undoubtedly more for a highly-engineered facility). When the initial capital costs are added to the requirement to provide funds for operations, closure, and custodial care, it is evident that disposal fees will increase dramatically.

One should also keep in mind that there are three regions, the Northwest, Rocky Mountain, and Central, whose combined low-level radioactive waste in 1984 amounted to less than 7% of the nation's total waste disposed of in that year. Obviously disposal fees in these regions will be far in excess of present disposal rates. The net effect of this situation is that one either provides for a user surcharge or a taxpayer subsidy. Neither is desirable.

Class "C" Wastes

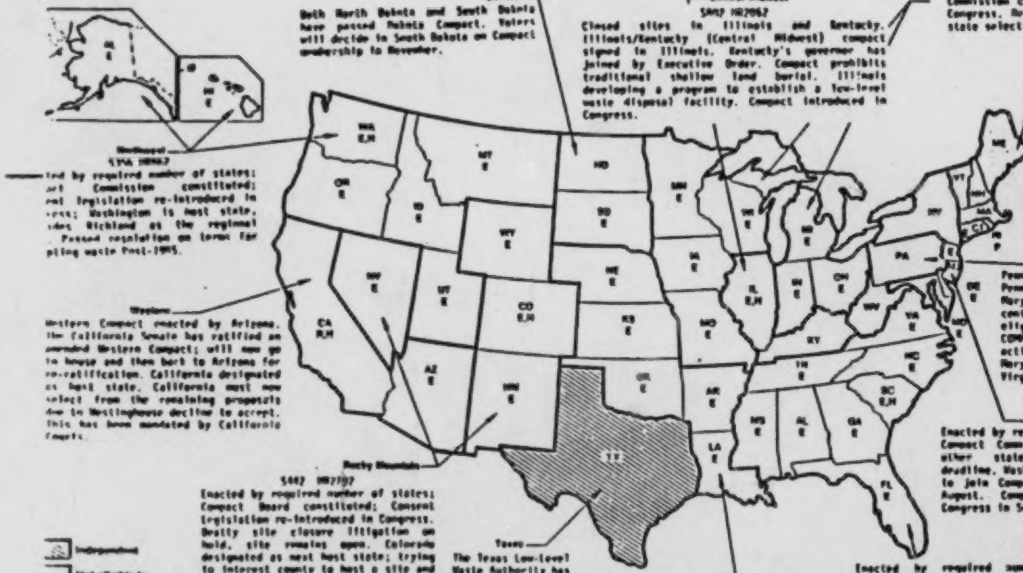
There have been some recent requests to remove Class "C" waste from its current low-level designation thus requiring it to be placed in a federal repository. This action is unwarranted. It would make very little sense to cut off Class "C" waste going into the existing low-level radioactive waste sites for the next seven years, inasmuch as those sites have been disposing of Class "C" waste for over 20 years, the volume of which approximates one percent a year. Thus such a change in category would have no appreciable impact on the existing sites during the seven year transition period. Burying Class "C" waste in DOE facilities is also impractical as they are also defined as low-level waste facilities. Further, DOE is not regulated by the NRC, thereby removing Class "C" wastes from the regulatory controls of that agency. Finally, the primary DOE low-level facilities potentially targeted for receipt of this waste are located in the three states of Nevada, Washington, and South Carolina.

Mr. Chairman, this concludes my testimony. Should the Committee have any questions, I would be pleased to respond.

NEW INFORMATION APPEARS IN CAPITAL LETTERS.

Regional Low-Level Waste Compacts—Status: July 31, 1985

Exhibit A



Midwest
S899 HR2635
Enacted by required number of states; Compact Commission constituted. Compact re-introduced in Congress. Neither host state nor method of host state selection identified.

Central Midwest
S897 HR2062
Closed sites in Illinois and Kentucky. Illinois/Kentucky (Central Midwest) compact signed in Illinois. Kentucky's governor has joined by Executive Order. Compact prohibits traditional shallow land burial. Illinois developing a program to establish a low-level waste disposal facility. Compact introduced in Congress.

Dakota
Both North Dakota and South Dakota have passed Dakota Compact. Voters will decide in South Dakota on Compact membership in November.

Unaffiliated States
New York State Energy Office recommended that New York pursue having a facility. Proposed storage of non-utility waste at West Valley. Legislation introduced. LEGISLATURE HAS RECESSED SPECIAL SESSION MAY BE CALLED IN SEPTEMBER. MA moving ahead as if they will have a site. Siting process drafted by EOEA. Another has been drafted by Special Legislative Committee on LLRW. HEARINGS IN SEPTEMBER.

Appalachian
Pennsylvania's Governor proposed a Pennsylvania/W Virginia, Delaware and Maryland (Appalachian) Compact. States contiguous to Pennsylvania are eligible to join. SENATE PASSED COMPACT BILL. NO ACTION IN HOUSE. No action expected in Delaware and Maryland until PA passes compact. W Virginia passed Compact.

Northeast
Enacted by required number of states; Compact Commission constituted. All other states missed eligibility deadline. Washington DC has petitioned to join Compact. To be voted on in August. Compact to be submitted to Congress in September.

Southeast
S44 HR1267
Enacted by required number of states. Compact Commission constituted; consent legislation re-introduced in Congress. South Carolina is host state through 1992 (Barnwell); compact requires new site by 1991. Dames and Moore selected as contractor for determining future facility needs and for host state and site selection criteria and methodology development. Host state selection criteria completed and adopted by Commission. Dames & Moore also to complete a regional screening. Legislation has been passed by House for Governor to take action to close site if compact not passed by Jan 1, 1986. Action may be (a) to close site completely, but allow SC generators to store waste there, or (b) to close site to all out of state generators. Host state to be selected by S/86 if necessary.

Northwest
S1ЧА HR867
ted by required number of states; act Commission constituted; ent legislation re-introduced in ress; Washington is host state, ides Richland as the regional . Passed regulation on terms for pting waste Post-1995.

Western
Western Compact enacted by Arizona. The California Senate has ratified an amended Western Compact; will now go to house and then back to Arizona for re-ratification. California designated as host state. California must now select from the remaining proposals due to Westinghouse decline to accept. This has been mandated by California Courts.

Rocky Mountain
S442 HR2702
Enacted by required number of states; Compact Board constituted; Consent legislation re-introduced in Congress. Beatty site closure litigation on hold, site remains open. Colorado designated as next host state; trying to interest county to host a site and a site operator to develop a site. North Dakota will become member effective 7/1/87 if Compact Membership Referendum fails in South Dakota.

Texas
The Texas Low-Level Waste Authority has been directed to reassess several potential sites prior to the final designation of a site in August. Several areas in Western Texas, which received high survey scores are being re-screened for licensability.

Central States
S655 HR1046
Enacted by required number of states; Compact Commission constituted; consent legislation re-introduced in Congress. Host state not identified; compact allows private industry to propose sites. Site suitability screening study across all five states IS COMPLETE.

▨ Independent

☐ Not eligible to a compact including Wash D.C. and Puerto Rico

E — Enacted into state law
P — Passed by at least one house
R — Rejected by at least one house
H — Designated host state

* Awaiting gubernatorial signature

PREPARED BY THE DEPARTMENT OF ENERGY

Exhibit A

(DATES ARE CALENDAR YEAR)

LOW LEVEL WASTE COMPACT ACTIVITY
07/31/85

KEY	STATUS	
	ESTIMATED DATE	ACTUAL DATE

REGION	COMPACT ENACTED BY MINIMUM # OF STATES	CONGRESSIONAL CONSENT	REGIONAL COMMISSION CONSTITUTED	HOST STATE SELECTION PROCESS DEFINED	HOST STATE IDENTIFIED	SITING CRITERIA AND PROCESS DEVELOPED	SCREENING CONCLUDED AND AREAS OF INTEREST IDENTIFIED	CANDIDATE SITES SELECTED	PRIMARY SITE CHARACTERIZATION COMPLETED
APPALACHIAN	NO	NOT SUBMITTED	NO	YES, IN COMPACT	YES, PENNSYLVANIA	NO	NO	NO	NO
CENTRAL STATES	YES 1Q83 1Q83	RE-SUBMITTED TO BOTH HOUSES 4Q83 1Q85	YES 2Q83 2Q83	PARTIALLY DEFINED IN COMPACT	NO 2Q85	INITIAL CRITERIA DEVELOPMENT 1Q84	INITIAL SCREENING STUDY UNDER-WAY 4Q84	NO 4Q85	NO 4Q86
MIDWEST	YES 2Q83 2Q83	RESUBMITTED TO BOTH HOUSES 1Q84 2Q85	YES 1Q84 4Q83	MINIMALLY DEFINED IN COMPACT	NO 1Q86	NO 2Q86	NO 4Q86	NO 2Q87	NO 2Q88
NORTHEAST	YES 1Q83 2Q83	NOT SUBMITTED 2Q84	NO 3Q83	MINIMALLY DEFINED IN COMPACT	NO 1Q86	NO 3Q85	NO 4Q86	NO 2Q87	NO 2Q88
NORTHWEST	YES 2Q81 2Q81	RE-SUBMITTED TO BOTH HOUSES 1Q83 1Q85	YES 1Q82 1Q82	YES, COMPACT IDENTIFIES HOST STATE	YES, RICHLAND, WA OPEN 2Q81 2Q81	N/A	N/A	N/A	N/A
ROCKY MOUNTAIN	YES 1Q83 1Q83	RE-SUBMITTED TO BOTH HOUSES 4Q83 2Q85	YES. 3Q83 4Q83	YES, COMPACT CONTAINS FORMULA	YES BEATTY NV/CO 1Q83 1Q83	YES, BY HOST STATE 2Q84	POSSIBLE BY STATE OR INDUSTRY 4Q84	NO, NATURITA SITE WITHDRAWN 4Q85	NO 4Q86
SOUTHEAST	YES 2Q83 2Q83	RE-SUBMITTED TO BOTH HOUSES 4Q83 1Q85	YES 3Q83 4Q83	YES, COMPACT IDENTIFIES HOST STATE	YES,BARNWELL SC, THRU '92 NEXT HOST UNIDENTIFIED 3Q86	HOST STATE SELECTION CRITERIA DEVELOPED	NO, REGION WILL DO. 2Q87	NO 4Q87	NO 4Q88
TEXAS	N/A	N/A	STATE DISPOSAL AUTHORITY ESTABLISHED 4Q82 4Q82	N/A	YES, TEXAS N/A	YES 1Q83 1Q83	YES. 3Q83 3Q83	YES 4Q83 4Q84	NO, 12 MONTH STUDY INITIATED. 4Q84
WESTERN	NO	NOT SUBMITTED	NO	YES, DEFINED IN COMPACT	YES, CALIFORNIA N/A	ADOPTED 10 CFR 61 1Q84 1/84	YES 2Q84 4/84	NO 4Q84	NO 4Q85

PREPARED BY THE DEPARTMENT OF ENERGY

Exhibit B

NRC-EPA REGULATION OF LOW-LEVEL RADIOACTIVE WASTE SITES

The commercial low-level radioactive waste sites dispose of source, by-product and small quantities of special nuclear material under the aegis of the Atomic Energy Act of 1954, as amended. Naturally occurring radioactive materials (NARM)*, accelerator-produced isotopes, and hazardous waste are regulated by the states and EPA under RCRA. All of the commercial sites are engaged in the disposal of low-level atomic energy waste and NARM wastes, with minute quantities of hazardous waste comingled with the rad waste. For example, scintillation vials used in medical research and analyses contain radioactive materials in organic solvents.

The goal of both Part 61 of the NRC Regulations and 40 CFR 264 of the EPA regulations is the protection of the public health and safety. However, the regulations differ in both approach and design. The conflicts in the regulations are set forth below:

EPA/NRC DISPOSAL REQUIREMENTS

EPA Hazardous Waste Disposal Permit Requirements: 40 CFR 264	NRC Low-Level Radioactive Waste Requirements: 10 CFR 61
o Requires detailed chemical and physical analysis of representative sample prior to treatment or disposal. Liability on operator. [264.136(a)(1)].	o Generator/packagers assure that classification characteristics and stability satisfy 61.55 and 61.56 (20.311).
o Analysis above will require chemical laboratory handling of sample.	o 61.55 and 61.56 provide classification and characteristics which assure suitability for land disposal. No accommodations made for treatment.

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* For example, uranium, thorium, radium, and tritium.

EPA Hazardous Waste Disposal Permit Requirements: 40 CFR 264	NRC Low-Level Radioactive Waste Requirements: 10 CFR 61
o Because of liability on disposer each movement of waste must be inspected and, if necessary, sampled and analyzed to assure identity matching manifest (drums must be opened). [264.13(a)(4)].	o 61.56(a)(8) requires treatment of hazardous component to minimize to extent practicable the hazard from non-radioactive material.
	o Liability, assurances and QC program of generator eliminates need for disposer to open and inspect containers, for chem lab to handle, in keeping with ALARA.**
	o Manifest must contain chemical form, solidification agent, chelating agent, etc. (20.311).
o Requires inspection and, if necessary, analyses of incoming wastes and reporting of manifest discrepancies in type or quantity. (264.72).	o ALARA discourages opening of containers. Identification liability is on generator. Manifest discrepancies in in type and are not detectable at disposal facility.
o Requires operating record containing waste analyses and inspection results (264.73).	o Analysis and inspection of waste movement discouraged due to ALARA.
o Requires detection and compliance monitoring of chemicals. Also, corrective action as part of permit. Monitoring parameters are of chemical nature and comprise the groundwater protection standard and hazardous constituent and concentration limits list 264 Subpart F.	o Requirements for groundwater monitoring address only radionuclides. (61.53).

** ALARA. NRC's guiding principle to minimize exposure, "as low as reasonably achievable."

EPA Hazardous Waste Disposal Permit Requirements: 40 CFR 264	NRC Low-Level Radioactive Waste Requirements: 10 CFR 61
o Requires operation and closure that will minimize ongoing maintenance (246.111 and 265.301).	o Requires operation and closure to achieve stability necessary to eliminate the need for ongoing maintenance to the maximum extent possible (61.13, 61.44, 61.52).
o Requires 30-years post closure care (264.117).	o Requires 5-year post closure care and 100-year institutional control (61.70).
o Maintenance after post closure care accommodated by post closure liability tax on RCRA hazardous wastes.	o Funding for institutional care (100 years) provided via perpetual care and maintenance fund which is collected from disposer based on waste receipt.
o Requires synthetic liners (264.301).	o Combines site locational characteristics, waste stability and necessary constructed barriers to minimize contaminant migration to groundwater (61.50,51.51).
o Requires leachate collection and and removal systems (264.301).	o Discourages leachate collection and removal systems due to long term maintenance (p. 547450 of FR 47); relies instead on locational characteristics and stability.
o Requires removal, treatment, and disposal of contaminated leachate (264.301).	o ALARA is violated if contaminated leachate is handled, increasing exposure. Reliance instead on prevention of the need.
o No requirement.	o RCRA hazardous waste must be treated to reduce to the maximum extent practicable the potential hazard from non-radiological materials (61.566(8).

Exhibit C

MCCAIN018

AMENDMENT TO THE COMMITTEE PRINT OF JULY 18, 1985
(H.R. 1083, AS REPORTED FROM THE SUBCOMMITTEE)
OFFERED BY MR. MCCAIN

Page 34, line 23, strike out the close quotation mark and the period following and insert after such line the following new section:

``SEC. 13. MIXED WASTES.

``(a) IDENTIFICATION.--Not later than 90 days after the date of the enactment of the Low-Level Radioactive Waste Policy ~~Amendments~~ Act of 1985, the Administrator of the Environmental Protection Agency (hereafter in this section referred to as the `Administrator'), shall with the concurrence of the Nuclear Regulatory Commission, identify and publish in the Federal Register a list of any substances disposed of or projected to be disposed of at commercial low-level radioactive waste disposal facilities identified or listed as hazardous waste by the Environmental Protection Agency under subtitle C of the Solid Waste Disposal Act, which, due to their volume, concentration, composition, hazard, or other relevant characteristics, should be subject to regulation under subtitle C of the Solid Waste Disposal Act.

(b) REGULATIONS.--Not later than 12 months after the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985, the Administrator, with the concurrence of the Nuclear Regulatory Commission, shall promulgate regulations governing the management and disposal of substances identified under subsection (a) at commercial low-level radioactive waste disposal facilities. Such regulations shall prescribe methods of treatment, handling, disposal, or monitoring appropriate for the substances identified under subsection (a) and shall ensure a level of environmental protection at least equivalent to that provided for such wastes under subtitle C of the Solid Waste Disposal Act.

"(c) DELEGATION OF AUTHORITY.--Not later than 180 days after complying with subsection (a), the Administrator shall enter into an agreement with the Nuclear Regulatory Commission under which the Administrator shall delegate permitting authority under section 3005 of subtitle C of the Solid Waste Disposal Act to the Nuclear Regulatory Commission for the disposal of waste identified under subsection (a). Such agreement shall provide for the exercise of such authority in accordance with part 61 of title 10 of the Code of Federal Regulations and compatible with the regulation of hazardous waste under subtitle C of the Solid Waste Disposal Act.

(d) INTERIM REQUIREMENTS.--Notwithstanding any other provision of law, any regional disposal facility referred to in paragraphs (1) through (3) of section 5(b), which is subject to regulation under subtitle C of the Solid Waste Disposal Act, shall be required to comply with Interim Status requirements of the Hazardous and Solid Waste Amendments of 1984 not later than 12 months after the date of the enactment of the Low-Level Radioactive Waste Policy Amendments Act of 1985. Any such facility shall not be required to obtain a permit under subpart B of the Solid Waste Disposal Act until the regulations under subsection (b) have been promulgated.''

Exhibit D

U.S. LOW-LEVEL RADIOACTIVE WASTE VOLUME PROJECTION

Assumptions: 3% annual growth rate plus allowance for 40 additional nuclear power reactors scheduled to come on-line by 1991. Reactors are calculated at generating approximately 20,000 cubic feet per year

Year	Cubic Feet (1,000's)
1985	2,692
1986	2,746
1987	2,763
1988	2,781
1989	2,822
1990	2,886
1991	2,972
1992	3,041
1993	3,132
1994	3,226
1995	3,323
1996	3,422
1997	3,525
1998	3,631
1999	3,740
2000	3,852

Prepared by US Ecology, Inc.

Senator Evans [presiding]. Thank you.

We'll next hear from Mr. Stalvey.

STATEMENT OF ALLAN E. STALVEY, DIRECTOR, PUBLIC AFFAIRS, CHEM-NUCLEAR SYSTEMS, INC., COLUMBIA, SC, ACCOMPANIED BY DAVID EBENHACK, VICE PRESIDENT OF REGULATORY AFFAIRS, CHEM-NUCLEAR SYSTEMS, INC.

Mr. Stalvey. Thank you, Senator.

Thank you for allowing Chem-Nuclear the opportunity to present testimony at this hearing today on these amendments to the 1980 Policy Act.

Chem-Nuclear has always supported the regionalization of the management of low-level radioactive waste. We support the 1980 Waste Policy Act. And we followed closely the negotiating process that resulted in the formulation of the Southeast Radioactive Waste Compact, and supported its enactment by the South Carolina legislature.

And we support congressional ratification of the Southeast Compact as it was submitted to Congress for approval.

Chem-Nuclear also supports the general approach included in both S. 1578 and S. 1517 and Senator Thurmond's amendments thereto. We would, however, like to suggest some changes to certain provisions of these bills. Should these changes be made, we believe they will strengthen the legislation and provide a better framework in which we can move to full implementation of the policies contained in the 1980 Waste Policy Act.

First, Chem-Nuclear suggests that the "three-State agreement" provided for in section 5A(3) of 1083 be eliminated. This agreement calls for the three sited States to enter into an agreement to assign generators to one of the three existing disposal sites. This arrangement is bureacratic, cumbersome, and would ultimately complicate the regulatory process which is adequately and correctly vested in the States and the NRC.

The free market should be allowed to govern the distribution of waste within the parameters estabished by the compacts and the allocations and caps provided for in the amendments. This market approach to the disposal of low-level waste has worked well in the past, and there's no reason to think that it will not in the future.

If, however, in the latter years covered by this legislation, the volume of waste produced by generators reaches or exceeds the legislatively mandated caps, or if some other condition develops that is not now anticipated, some type of agreement could be implemented.

S. 1578 and S. 1517 could include a triggering device to take care of this eventuality. In short, this portion of the low-level radioactive waste disposal system isn't broke, so let's not try to fix it.

In addition, there have been efforts made which would mandate that NRC conduct a study to identify waste currently classified as low-level waste and to promulgate rule, if appropriate, to require different handling of these low-level wastes not currently being handled in a manner that protects the public's health and safety and the environment.

These efforts are clearly designed to attempt to reclassify those wastes currently classified as Class C wastes.

Chem-Nuclear categorically asserts that the current methodology used to handle and dispose of Class C wastes is perfectly safe and poses no danger to the public's health and safety or to the environment. If our current methodology were not safe, we would not use it.

Over the years that Chem-Nuclear has operated the Barnwell site, we have developed carefully designed, special techniques for handling and disposing of class C wastes. These techniques are under constant review, and every possible improvement is made. Our efforts have resulted in absolutely minimal exposure to our employees, which are far below any and all NRC standards, and secure and effective isolation of these wastes.

We are confident that the NRC is conpetent and currently empowered to make any necessary and desirable changes in waste classification and handling and disposal methods without this legislative mandate.

In closing, we would urge quick passage of the Waste Policy Act of 1985, the amendments thereto, and we urge your consideration and adaptation of the changes that we have suggested.

Mr. Chairman, I have Mr. David Ebenhack, vice president of regulatory affairs for Chem-Nuclear who is available for questions also.

[The prepared statement of Mr. Stalvey follows:]

STATEMENT BY

ALLAN E. STALVEY
Director, Public Affairs
Chem-Nuclear Systems, Inc.
Columbia, South Carolina

SUBCOMMITTEE ON ENERGY RESEARCH DEVELOPMENT OF THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

SUBCOMMITTEE ON NUCLEAR REGULATION OF THE SENATE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

Thank you for allowing Chem-Nuclear the opportunity to present testimony before this joint subcommittee regarding proposed amendments to the 1980 Waste Policy Act.

Chem-Nuclear Systems has consistently supported the regionalization of the management of low-level radioactive waste. We support the 1980 Waste Policy Act; we followed closely the negotiating process that resulted in the formulation of the Southeast Radioactive Waste Compact, and supported its enactment by the South Carolina General Assembly; and we support Congressional ratification of the Southeast Compact as it was submitted to Congress for approval.

Chem-Nuclear supports the general approach included in both S1578 and S1517. We would, however, like to suggest changes in certain provisions of these bills. Should these changes be made, we believe that they will strengthen the legislation and provide a better framework in which we can move to full implementation of the policies contained in the 1980 Waste Policy Act.

First, Chem-Nuclear suggests that the "three-state agreement" provided for in Section 5A(3) be eliminated. This agreement calls for the three sited states to enter into an agreement to assign generators to one of the three existing disposal sites. This arrangement is bureaucratic, cumbersome, and could ultimately complicate the regulatory process which is adequately and correctly vested in the states and the NRC.

The free market should be allowed to govern the distribution of waste within the parameters established by the compacts and the allocations and caps provided for in the amendments. This market approach to the disposal of low-level wastes has worked well in the past, and there is no reason to think that it will not in the future.

If, however, in the latter years covered by this legislation, the volume of wastes produced by generators reaches or exceeds the legislatively mandated caps, or if some other condition develops that is not now anticipated, some type of agreement could be implemented. S1578 and S1517 could include a triggering device to take care of this eventuality. In short, this portion of the low-level radioactive waste disposal system isn't broke, so let's not try to fix it.

There have been efforts made which would mandate that NRC conduct a study to identify wastes currently classified as low-level wastes, and to promulgate a rule, if appropriate, to require different handling of those low-level wastes not currently being handled in a manner that protects the public's health and safety and the environment. These efforts are clearly designed to attempt to reclassify those wastes currently classified as Class C wastes.

Chem-Nuclear categorically asserts that the current methodology used to handle and dispose of Class C waste is perfectly safe and poses no danger to the public's health and safety or to the environment. If our current methodology were not safe, we would not use it. Over the years that Chem-Nuclear has operated the Barnwell site we have developed carefully designed, special techniques for handling and disposing of Class C waste. These techniques are under constant review and every possible improvement is made. Our efforts have resulted in absolutely minimal exposure to our employees (far below any and all NRC standards), and secure, effective isolation of these wastes. We are confident that the NRC is competent and currently empowered to make any necessary and desirable changes in waste classification and handling and disposal methods without this legislative mandate.

We urge quick passage of the Waste Policy Act of 1985 and we urge your consideration and adaptation of the changes to it suggested above.

Senator **Evans**. I guess this has been a long hearing and those of us who have had some other responsibilities have come in, and perhaps some of the questions may be duplicative of testimony this morning. But it seems to me, Mr. Scoville, that you testified that you and the medical community, hospitals in particular, cannot serve two masters. But hasn't that been the case for some years, and haven't you made a profit in doing so?

In other words, has it not worked in the past, and aren't many industries really governed simultaneously by limitations imposed by several regulatory agencies? I don't think any of us are suggesting that's the best of all worlds, but it's the real world. It's quite common.

Is it really necessary to reach perfection here, or can we operate in the way we have?

Mr. **Scoville**. Senator, I guess I have to clarify what I said. Surely we are regulated by many, many agencies, not just EPA and NRC. Different aspects of our operation and different aspects of our business are subject to regulation by a different agency.

The current instance, in answer to your question, first of all, no, we haven't been subject to two bodies of regulation applying to the same action in the past. There's only recently been an interpretation that certain of the material we dispose of as radioactive waste fully in accordance with NRC regulations might also be defined to be hazardous chemicals and therefore their disposal subject to EPA regulation.

Senator **Evans**. Are those specific to scintillation vials?

Mr. **Scoville**. Scintillation vials are the most easily identified ones, because xylenes and toluenes are organic chemicals that are hazardous and regulated by RCRA. In the instance of the use of the medical community in the "scintillation cocktail" as it's called, those materials contain radioactive material as well.

Historically, they've been handled as radioactive material only, and the guiding philosophy has been that the radioactivity was the greater hazard, so the regulations protecting people and the environment from that greatest hazard would apply.

Now there seem to be moves to apply both bodies of regulation to the same operation and they are in conflict.

Senator **Evans**. I understand how they could be in conflict. Would you suggest that here are two separate things, a problem to whatever degree we can measure it, of radioactivity to be handled, and a problem of toxic chemicals to be handled are all apparently involved in the same materials. Two different agencies or two different sets of regulations apply, one to the toxic chemicals, one to radioactivity.

In your view, is one so much more important than the other that one should be ignored? Or how best would you suggest handling it?

Mr. **Scoville**. Senator, both of the regulations—let me clarify this and make it a point. Both of the regulations are sufficient to protect the public health and safety and the environment. They both do so under a slightly different philosophy.

As an operator, it wouldn't matter to me which ones are visited on me—and I operate hazardous chemical waste sites fully in accordance with the RCRA requirements. I know them very well; my people are well versed in EPA RCRA control as well as in NRC part 61 control.

I think that the philosophies are slightly different and because of that, since most of the material we handle, the radioactivity is indeed the greatest hazard, I believe that those Part 61 regulations are the most practical. And they've been working for a good many years at our facility in Washington where we have no problem at all, and our facility in Nevada that has operated for 20 years, and there's not been any difficulty to either the people or the environment.

Either set would apply, but somebody has to apply one or the other, because they are in conflict.

Senator EVANS. Is it possible in the processing that you use to separate the toxic chemicals from the radioactivity, in doing so have each one track its own set of regulations?

I would suggest, without doing a lot of study in this, I would suggest that it wouldn't be practical at all to do that. It would be extremely costly and for no particular benefit. They can be properly disposed of under either set of regulation.

And as I understand from what you just said recently, that radioactivity in your view represents by far the largest potential environmental hazard of the two, in the particular things you're dealing with?

Mr. SCOVILLE. I wouldn't say that generally is true, but in the waste material in the low-level waste generated in this country, those that have hazardous chemical attributes would represent probably less than 10 percent of the total. And therefore, I would say the regulations that best fit the 90 percent ought to apply to all of it.

Senator EVANS. Have you worked closely with the State of Washington in the disposal site, with their terms and their regulations? Can you tell me, if so, to what degree and what the results have been?

Mr. SCOVILLE. Yes, we have worked very closely with the State of Washington and enjoy having State of Washington inspectors on our site at all times during its operation.

We have, I think, a good relationship with the regulatory people there, and we do deal with two agencies: the Department of Ecology, which holds the lease to our facility; and the Department of Social—DSHS—Department of Social——

Senator EVANS. Social Health Services. Having originated that agency, I do remember the——

Mr. SCOVILLE. Yes, indeed. That agency is named various things in various States, and I can remember the letters, but I can't remember the words.

Senator EVANS. It's called various things in our own State, too. [Laughter.]

Mr. SCOVILLE. I think the program in Washington is an advanced program, it's professionally managed, it's regulations are clear and appropriate. There is a dispute between those two agencies over who should be in charge of the mixed waste, just as there is at the Federal level.

So that I think if we solved the Federal scheme of things, the State scheme of things will follow in line with that because they are usually agreement programs under the Federal auspices.

Senator EVANS. Mr. Stalvey, you mentioned alternative technologies to landfill. Several are currently available. Which appear to you to have the best potential—and perhaps either of you, or both, might respond to that. As we look ahead, what's going to give us the most likelihood of a better situation in the handling of low-level wastes as alternatives to landfill as we now know it?

Mr. STALVEY. Well, Senator, Chem-Nuclear has always stated and felt like the shallow burial method of disposal was an adequate method of disposal. There's nothing in our studies or any of the studies to show that other alternatives need to be developed.

Mr. Ebenhack as studied a lot of the alternatives and is familiar with those. He may be a better person to address that than I.

Mr. EBENHACK. If I may, Senator, the shallow land burial, we have shown, as has U.S. Ecology in the two sites that were mentioned, has shown that it can work and be safe for the environment. However, we do also recognize that there is general sentiment in the country that, because of past practices of years and years ago when things were much different, and they had some problems there, that there's a sentiment that you should do more to make it safer.

There certainly are a number of different techniques to do that. You can add more packaging, more protection, more layers, more barriers between the waste and the environment. Any one of them would slightly enhance the safety. It's matter of cost/benefit, and it depends on how much you're willing to spend, how much money you want to spend to protect the environment.

What we do now is certainly sufficient and adequate and does protect the environment. However, like I said, the public sentiment is that, especially due to past practices, that it has not been in the past; therefore, there's a move or a sentiment to make it better. That can be done. It's just a matter of how much money you want to spend to do that.

Senator EVANS. I suspect it's probably true that in the past, with what we knew at that time, we thought that what we were doing was adequate. It turned out not to be with subsequent experience and subsequent information.

Are we absolutely sure that we're at a different point now? We know what we know now; we're not absolutely sure what the future will show us. And is it perhaps going a little far to say that we're absolutely certain that what we're doing now is adequate for the long term?

Mr. EBENHACK. I don't think we're absolutely certain of anything, Senator. However, I do know that 20 years ago, they used to dispose of liquids in trenches. That has been banned for several years now, and they use medias which do not leak. Those basic sorts of changes in practices make tremendous differences in the evironmental impact of such facilities.

Senator EVANS. You mentioned incineration. In your view, does that have any substantial benefits? Are you running into problems of potential pollution by air or by the emissions that come from incineration? What's to be gained in terms of incineration versus its cost?

Mr. EBENHACK. I'd like to take a shot at it, but also——

Senator EVANS. Maybe Mr. Scoville and then——

Mr. EBENHACK. He's trying to establish one.

Mr. SCOVILLE. Right. We know some of the problems. Actually, we think incineration represents a very good volume reduction technology. That's what it does, is reduce volume about a factor of 40. I think that that's important when one considers that, as we are today, that the Nation is going to be divided into a number of compacts, that we're going to end up with a lot of disposal facilities, one for each compact region, as opposed to the three that we have currently serving the entire country.

Those facilities are going to be very expensive because the unit cost is going to be very high. They won't have the high volume to spread that cost over. I think that in that instance, volume reduction becomes very important because it means they can get by with a much smaller facility. And I think incineration is one way of doing that, and extending site life a good bit. And super-compaction is another way.

And my company is pursuing both of those, as well as shallow burial.

Senator EVANS. Do you have any comment at this point, although we're talking about low-level waste, does incineration hold the same potential value in disposable high-level waste?

Mr. SCOVILLE. No, sir. High-level waste is quite a different question that we as a Government, I believe, have wrestled with and fumbled pretty badly. Be that as it may, at this point it's primarily metallic——

Senator EVANS. We're still trying to pick up the fumble.

Mr. SCOVILLE. It's either ceramic materials or it's metallic, and they just don't burn very well. So that you couldn't compact that way. I think we should have reprocessed our fuel like the French program is doing.

Senator EVANS. Thank you very much, gentlemen. You've been very helpful.

Next I'd like to call on the Governor of the State of Washington, the Honorable Booth Gardner, if he would come forward.

[Pause.]

Senator EVANS. Governor Gardner, we're particularly pleased to welcome you to this Washington. I envy you the length of time you spend in the other Washington, as you might guess, but you've come—and I think I ought to have a word or two of congratulations to you and to the State of Washington for the work it has done in attempting to work closely with the various Federal agencies both on the questions of high-level and low-level waste.

I think we all know of the potential importance of the State of Washington in this issue and I am proud of the work that has been done by the State. Some of the officials have been before this committee and have testified earlier on other elements of this overall problem and have done so with great credit to the State.

So we welcome you here and are anxious to hear your testimony.

STATEMENT OF HON. BOOTH GARDNER, GOVERNOR, STATE OF WASHINGTON, ACCOMPANIED BY WRIGHT ANDREWS, COUNSEL TO NEVADA, WASHINGTON, AND THE SOUTHEAST COMPACT

Governor **Gardner**. Thank you very much.

I have a written draft. In the interests of time I am going to try to abbreviate, but I'd like the opportunity to turn this in toto at the end of my——

Senator **Evans**. The full statement will be made a part of the record.

Governor **Gardner**. Thank you.

First of all, I want to thank Senators Domenici and Simpson and the members of the subcommittee for the opportunity. I'm here, as everyone else has been today, I guess, to talk about the implementation of the 1980 Radioactive Waste Policy Act for Low-Level Waste.

This Act required that it be operational by January 1, 1986. The problem is that the 1980 Act lacked teeth and, as a consequence, not one single new site has been opened since that date. Consequently, I joined together with Governor Riley of South Carolina and Governor Bryan of Nevada to try to ensure that the 1980 law is eventually implemented.

We did so, Senator Evans, because the people of our States have taken unkindly to what we tend to call exclusively the dumping grounds for low-level waste in this ground. As it turns out now, we know and you know because of your tenure as Governor in the State of Washington, that we started out taking out less 100 cubic feet of waste originally. As recently as the 1970's, we took only 400,000 cubic feet of waste. Today in the State of Washington, we take up to 54 percent of the low-level radioactive waste generated nationwide, or over a million cubic feet of waste.

We feel that the compact system, as devised by the legislature, deserves to have an opportunity to be given a chance to work.

The three States clearly have been very patient in waiting for this to happen. And we decided, rather than being precipitous and taking emergency actions, to try to work with all the other States and the Governors in those States, to come up with—in consultation with them—to come up with some reasonable legislation which would satisfy not only the States but the utilities and others that are involved in the generation of wastes.

Consequently, we have come up with a compromise piece of legislation which is a package situation. And I emphasize the word "package," because there are elements in here which are absolutely carefully balanced and very firmly linked together. And if any element is changed to any extent, that drastically imbalances the legislation as is being proposed.

I probably need to say also that where we started out and where we are today is quite divergent. And I would be, I think, very correct in saying that all three Governors probably greatly dislike the legislation as it currently stands. But we realistically came to the conclusion that everyone involved in this situation did not like some of the conditions that were necessary, at least from the States' points of view, the siting States. So, we agreed to compromise and I think what we have now is a not likable, but livable, compromise for all people concerned.

The reason I emphasize that is that I don't want you to assume that significant changes can be made in this package without destroying this delicate balance. We have all agreed to deal with this as it's presented.

And with that, what I'd like to do is get into some of the particulars now.

First of the key compromise provisions is the continued guaranteed access for unsited waste States. The compromise, as it's been reached, would guarantee 7 more years of continued access through December 31, 1992. Now, in there are milestones, divided into a 4-year period, in which unsited areas are required in essence to move their siting process to a point where a license application is filed for approval of a new site, and a subsequent 3-year period for license approval and facility construction.

Length of time that's necessary for the States and regions to open new sites, whether that amount of time is necessary is debatable. Most of the sited States know from experience that it does not take nearly that long to do so, but in most cases the States will take the time, as much time as they're given. And that's why we think real time pressure is essential in order to move the siting process forward.

The 7-year transition period allowed in the package is an absolute maximum for the sited States, and that's the maximum we would accept. In fact, we find this lengthy period distasteful and would consider it totally unacceptable if it were not firmly linked to volume controls and enforceable milestones to measuring continued progress, and other offsetting provisions which I'll discuss subsequently.

Seven years should be ample. If States need more time, they have the option of building interim storage.

Now, let me get into the enforceable milestones. Given the past history for the undue delay and endless excuses by unsited areas for failure to open their own disposal sites, it should come as no surprise that the people of Washington, Nevada, and South Carolina insist on firm assurances that the transition period does not turn into another postponement period.

Therefore, the package provides that access be denied if milestones are missed. Those milestones contained in S. 1578 have been softened somewhat by the House committees that have considered this legislation. In particular, the House's version include a grace period after the first two milestones during which access would be allowed, but surcharges would be increased if the milestones were missed.

The intermediate milestones in the package, as reported by the Market subcommittee, can be summarized as follows:

By July 1, 1986, each State must ratify a regional compact or establish policy to open a disposal facility within its own borders.

The second milestone is: By January 1, 1988 a host State must be identified, a siting plan developed, and the authority to implement that plan delegated.

And thirdly, by January 1, 1990, a complete license application must be filed with the NRC or the appropriate agency of an agreement State, or the Governor of each State must certify to the NRC that the State will provide for the storage, disposal or management of any low-level radioactive waste generated within such State and requiring disposal after December 31, 1992.

While we can accept the milestones as contained in this package, as reported by the House Interior Committee or by the Market subcommittee, we would strongly oppose any further effort to weaken these provisions.

The next area is surcharges. The package also contains escalating surcharges on unsited generators. Such surcharges compensate the sited States for allowing interim access. In addition, they encourage volume reductions, especially by nonutility generators, and provide an economic incentive for opening new sites during the transition period.

The surcharges would be levied at the following levels: $10 per cubic foot in 1986–87; $20 per cubic foot in 1988–89; and $40 per cubic foot in 1990–92.

Now, we believe that the surcharges are modest and fair. We will not agree to slashing the surcharges. The current levels are far less than we originally considered, and they are a small price in our opinion to pay for 7 years continued access.

We will consider surcharge levels a fundamental element of the package and therefore are totally opposed to any reduction such as a 50-percent cut that some parties are suggesting. If the surcharges were changed, we would insist that other offsetting changes, such as tightening the milestones and shortening the period of guaranteed access be made.

I might note that utility generators have now indicated that they do not object to these surcharge levels.

Note: We do support the 25-percent rebate concept if it is structured so as to provide an incentive for opening new sites.

The sited States originally had suggested a similar rebate mechanism, since it can be designed as an incentive and can give State assistance in opening sites. Therefore, we would not object to a rebate concept being adopted in the final package, provided it does not call for rebates over 25 percent of the surcharge at current levels, and that any rebate mechanism be crafted to ensure that the funds will be used for site development.

Now, the third area is volume caps and volume reduction. Experts point out that dramatic volume reductions frequently can be achieved if waste generators employ proper management to reduce the amount of waste produced. In addition, they note that there are now many technologies available, such as super compacters, incinerators, decontamination processers and the like, to achieve further significant reductions.

Public sentiment in our State demands a change in many waste generator practices. I'm sure that you can understand that the sited States feel very strongly that immediate overall volume reductions to well below current level, where appropriate and possible. We considered demanding tougher provisions, such as requiring that utilities in unsited areas institute mandatory onsite storage of waste, and that unsited States immediately build interim storage facilities.

However, despite our conviction that far more volume reduction can be achieved, the sited States finally agreed in effect to freeze disposal volumes at present levels. According to the compromise packages, the total annual volume cap of 2.8 million cubic feet for the three States was agreed upon.

This includes a volume cap of 1.7 million cubic feet for all utility waste. It also includes a volume cap of each sited State as follows: The State of Washington, 1.4 million cubic feet; the State of South Carolina, 1.2 million cubic feet; and Nevada, 200,000 cubic feet.

I might note that the utility waste presented a special problem, since significant volume of new utility waste has been projected due to additional nuclear plants that are expected to come on line during the transition. We agreed not to demand onsite storage and volume caps at below current levels because of that factor.

Due to the projected utility waste volume increase, volume reductions by many utilities still will be necessary to keep utility waste volume at the freeze level of 1.7 million cubic feet per year.

We also developed a number of provisions and concepts to ensure fairness and flexibility for utilities. For example, the compromise package includes provisions that set utility allotments on an industry average and multiyear basis, permit the bartering of allotments among different utilities, and the like. Since the utility industry is now supporting these provisions and the 1.7 million cubic foot per year cap on utility waste, I'll not comment further on this particular part of the testimony.

With respect to the nonutility generators, volume reductions are to be attained through increased surcharges which I'll discuss later. The fact is that because of additional or current charges, the volume of non-utility waste has significantly decreased, and we do not expect this trend to change. Consequently, we believe that they will be able to stay within the 1 million cubic feet per year cap.

Before moving to highlight several other key elements of the compromise package, I want to stress that the sited States consider the volume caps, including the 1.7 million cap on utilities, to be set in concrete.

Now, the area of emergency exemption provisions. We acknowledge the need for emergency exemption provisions, but believe quite strongly that these emergency access provisions must be tightly drawn so that they do not become a loophole that undermines the volume reduction and the opening of new sites. In particular, we insist the NRC not be able to grant access simply because it would be costly for a generator to stop producing waste, or to build storage facilities, to employ volume reduction technologies.

Because of this and because we believe that the 7-year period to 1992 is adequate, we strongly feel that the time period for emergency access and the extensions of any such grant must be very limited. And we consider it essential that no renewal or renewals of emergency access after January 1, 1993, should extend over 180 days.

Let me be clear on that. We want no provisions or exemptions beyond 1993, and only 180-day renewals after 1992. Our concerns are best met by the emergency access provisions that are currently drafted.

Also, we want to discuss the 10-year congressional review, specifically that we hope that Congress will not reopen the approved compacts for a 10-year period, which is to say not until the transition to a regional disposal system is complete.

We have additional areas of concern which I'll not belabor at this juncture, but they are such as mixed waste and the three-State agreement administration provisions. I want to note that the sited States consider it essential that the final legislative package retain the provisions that guarantee that the States retain their existing regulatory authority over site criteria and licensing.

In conclusion, I hope the summary of this compromise package has been helpful to the subcommittee. This legislative package has been developed through a long and hard series of negotiations and compromise. These basic concepts are carefully linked and interwoven so as to offset otherwise unacceptable provisions from the varied perspectives of sited and unsited States, waste generators, and other interested parties.

With that, I thank you for the opportunity.

[The prepared statement of Governor Gardner follows:]

Testimony of

Honorable Booth Gardner

Governor of the State of Washington

Before the Joint Hearing on
Low-Level Radioactive Waste Disposal

of the

Subcommittee on Nuclear Regulation of the
Committee on Environment and Public Works

and the

Subcommittee on Energy Research and Development of the
Committee on Energy and Natural Resources

United States Senate

October 8, 1985

Chairman Domenici, Chairman Simpson and Members of the Subcommittees, I appreciate this opportunity to appear at your joint hearing on low-level radioactive waste disposal, and I want to thank you and Senators McClure and Stafford for expediting the Senate's consideration of this critical issue.

It is essential that Congress complete action this year on legislation that will finally implement the 1980 Low-Level Radioactive Waste Policy Act and grant consent to the low-level waste disposal compacts that have been reported favorably by the Senate Judiciary Committee.

As you know, the 1980 Act made each state responsible for providing for the disposal of low-level waste generated within its borders. It envisioned that a system of regional disposal sites for such waste would be operational by January 1, 1986. Unfortunately, the 1980 Act lacked "teeth" to ensure that states would not delay unnecessarily in meeting their disposal responsibilities. As a consequence, not a single new site has opened. Washington, South Carolina and Nevada, which have the only three operating disposal facilities, have continued to bear the entire burden of disposing of all other states' low-level waste.

I want to make it unquestionably clear that this totally unfair situation can not continue. My position on this issue also reflects the position of Governor Riley of South Carolina and Governor Bryan of Nevada. We joined together earlier this year to seek a workable legislative solution that will ensure that the 1980 law is implemented. We did so because the people of Washington, South Carolina and Nevada are simply unwilling to have their states continue to serve as the dumping grounds for all other states' nuclear garbage.

When our Washington site was opened in the 1960's, it took less than 100,000 cubic feet of waste per year; as recently as the late 1970's, we took only about 400,000 cubic feet per year. In the last ten years, that volume has tripled, and we now dispose of approximately 54% of the nation's low-level radioactive waste. This tremendous volume increase naturally has raised our citizens' concerns. They justifiable feel that we are bearing a very unfair burden.

In 1980, the people of Washington voted overwhelmingly to close our disposal facility to all out-of-state generators. While the particular legislative approach taken at that time did not survive legal challenge, the vote nevertheless clearly reflects the intense public sentiment on this issue. The only reason we have not moved again to restrict access to the site through more refined legislative and legal means is because we wanted to give the compact system envisioned in the 1980 Act a reasonable chance to work.

We are nearing the end of 1985, and the three sited states see disappointingly little progress in implementing the compact system. Our three states have been extremely patient. We now demand no special treatment, but we do insist on fairness. Washington, South Carolina and Nevada have been treated unfairly on this issue for far too long and this situation absolutely now must change. We therefore insist that unsited states and regions act promptly to fulfill their duty of handling their own waste.

Governor Riley, Governor Bryan and I made it clear long ago that if this is not done, we will be forced to take tough, parallel action to limit severely access to the three operating disposal sites. Let no one say this shows us lacking in cooperation. At the same time, we reached out to the unsited states and regions, waste generators, and environmental groups and sought in consultation with them to develop a reasonable legislative compromise that will solve our mutual problem without triggering a national disposal crisis.

As you may know, this compromise initiative by the sited states' Governors has resulted in a legislative package---and I must emphasize the word "package"---that offers a workable solution to this very difficult problem. This package was developed after months of consultation and negotiation with other interested parties. Its key elements are contained in S. 1578, introduced by Senator Thurmond. A number of its concepts also are contained in S. 1517, introduced by Senator McClure.

The compromise transition package also has been introduced in the House, where it now has been further refined by the House Interior Committee, under the leadership of Rep. Udall, and in certain respects also by Rep. Markey's Subcommittee of the House Commerce Committee.

The basic elements of this package, which I will highlight in a moment, are very carefully balanced and are firmly linked together. They simply cannot be considered independent of each other. When we began to develop this package we quickly found that certain interests of the various states and generators are so divergent that it would be impossible to draft a proposal everyone would like. In fact, we concluded that any politically acceptable compromise must include provisions that we and other parties dislike greatly, and which if viewed alone would be intolerable. The only way out of this dilemma of having to accept the otherwise unacceptable was to include offsetting provisions to make the compromise "not likeable, but liveable" for the various parties.

I also want to emphasize that given the very short time available to resolve this issue, we had to forego "normal" political posturing and come quickly to bottom line positions on key issues. Therefore, please do not assume that significant changes can be made in the package without destroying its delicate balance. While I would never suggest that no refinements and improvements can be made, I would strongly urge your Committees to retain the key provisions of this package as it was reported by the House Interior Committee.

We have found widespread support for this compromise by unsited states and major waste generators, including nuclear utilities, which now have agreed to join us in supporting the package as reported by Rep. Udall's Interior Committee.

Now, let me briefly outline the primary concepts in this compromise package and explain how they are linked together.

KEY COMPROMISE PROVISIONS

Continued Guaranteed Access for Unsited States' Waste

Since no new disposal sites will be operating by January 1, 1986, it is clear that a transition period will be necessary to allow other states and regions more time to meet their disposal responsibilities. The compromise would guarantee seven more years of continued access---through December 31, 1992---for waste from unsited states. This is divided into a four-year period during which unsited areas are required in essence to move their siting process to the point where a license application is filed for approval of a new site, and a subsequent three-year period for license approval and facility construction.

The length of time necessary for states and regions to open new sites is debatable. However, the sited states know from their own experience that it does not have to take nearly as long as many people are claiming and that, in most cases, states will take as much time as they are given before opening new sites. Real time pressure is essential in order to move the siting process forward.

The seven-year transition period allowed in the package is the absolute maximum that the sited states could ever accept. In fact, we find this lengthy period very distasteful, and would consider it totally unacceptable if it were not firmly linked to volume controls, enforceable milestones to measure continuing progress, and other offsetting provisions that I will discuss subsequently.

Seven years should be ample for all states and regions to assume their responsibility for disposing of their own waste. However, if any state or region finds that it wants or needs more time to develop a permanent disposal facility, it of course has the option and responsibility for building an interim storage facility or taking other appropriate actions to manage its generators' waste.

The construction of interim storage facilities, which can be licensed and built in a relatively short time, may be particularly appropriate for states concerned about how long it may take to license and construct alternative disposal technologies. We recognize that some states are likely to elect to use such alternative disposal methods instead of the traditional shallow land burial procedures we now utilize. They certainly should be free to do so, but if this means they can not have a permanent disposal facility operating by the end of 1992, they simply must plan to build interim storage facilities or manage their waste by other means. The sited states will not agree to bear such other states' disposal burdens after 1992.

Enforceable Milestones

Given the past history of undue delay and endless excuses by unsited areas for failure to open their own disposal sites, it should come as no surprise that the people of Washington, Nevada and South Carolina insist on firm assurances that this "transition period" does not turn out to be just another "postponement period." Accordingly, the package includes a series of interim milestones leading to site operation that must be met as a condition for continued access.

Enforceable milestones are essential. Simple monetary penalties for failure to meet milestones are totally inadequate. The failure of many states to act expeditiously to implement the 1980 Act over the last six years demonstrates that many decision makers will simply let their industries pay the increased costs of shipping waste elsewhere. Therefore, the package provides that access will be denied if milestones are missed. (Access would be restored as soon as the milestones are met.)

The milestones contained in S. 1578 have been softened somewhat by the House Committees that have considered this legislation. In particular, the House versions include a grace period after the first two milestones during which access would be allowed, but surcharges would be increased if the milestones were missed.

The intermediate milestones in the package as reported by the Markey Subcommittee can be summarized as follows:

- By July 1, 1986, each state must ratify a regional compact or establish policy to open a disposal facility within its own borders.
- By January 1, 1988, a host state must be identified, a siting plan developed, and authority to implement that plan delegated.
- By January 1, 1990, a complete license application must be filed with the NRC or the appropriate agency of an agreement state, or the Governor of the state must certify to the NRC that the state "will provide for the storage, disposal, or management of any low-level radioactive waste generated within such state and requiring disposal after December 31, 1992" and describe the actions that will be taken to ensure that the state will be capable of doing so.

While we can accept the milestones contained in the package as reported by the House Interior Committee or by the Markey Subcommittee, we would strongly oppose any further effort to weaken these provisions. There is widespread agreement that unsited states can meet the milestones. In fact, many are acknowledging that the milestones, especially in 1990, already may be too weak.

Surcharges

The package also contains escalating surcharges on unsited generators. Such surcharges compensate the sited states for allowing interim access. In addition, they encourage volume reductions, especially by non-utility generators, and provide an economic incentive for opening new sites during the transition period.

The surcharges would be levied at the following levels:

- $10 per cubic foot in 1986-1987
- $20 per cubic foot in 1988-1989
- $40 per cubic foot in 1990-1992.

Rep. Markey's version of the legislation provides for a rebate of 25% of the surcharge to the state in which the waste originated if the state meets the 1986 and 1988 milestones and of 50% if the 1990 milestone is met. Unfortunately, the rebate is not specifically designated for site development purposes.

The sited states originally had suggested a similar rebate mechanism since it can be designed as an incentive and can give states assistance in opening new sites. Therefore, we would not object to such a rebate concept being adopted in the final package, provided it does not call for rebates of over 25% of surcharges at current levels. Any rebate mechanism also should be crafted to ensure that the rebated funds will be used for new site development.

We believe the surcharges are quite modest and fair. We find that utilities and most waste generators are willing to accept these surcharge levels. Understandably, some unsited generators would prefer to pay less, and some suggest that the surcharges be greatly reduced. The sited states will not agree to slashing the surcharges. The current levels are far less than we originally proposed, and are a small price to pay for seven years' continued access. I might also note that such continued access will increase our operating costs. Under the terms of our compact, we anticipated disposing of only around 200,000 cubic feet of waste per year at Hanford. It will be necessary to modernize our operations to continue to accept a much higher volume of waste over the next seven years.

We consider the surcharge levels a fundamental element of the package, and we therefore are totally opposed to any reduction, such as a 50% cut that some parties are suggesting. If the surcharges were changed, we would insist that other offsetting changes -- such as tightening the milestones and shortening the period of guaranteed access -- be made. However, we will support the 25% rebate concept, if it is structured so as to provide an incentive for opening new sites.

Volume Caps and Volume Reduction

Experts point out that dramatic volume reductions frequently can be achieved if waste generators employ proper management to reduce the amount of waste produced. In addition, they note that there now are many technologies available---supercompactors, incinerators, decontamination processes, etc.---to achieve further significant reductions. Technical experts also have advised us that many major generators simply have elected not to spend money to implement such practices and technologies since it has been easier and cheaper to send their nuclear garbage to Washington, Nevada and South Carolina.

Public sentiment in our states now demands a change in many waste generators' practices. Their "throw away" mentality must end. Henceforth, it will be neither easy nor cheap to send others' garbage to Washington and the other two sited states.

I am sure that you can therefore understand the sited states' very strong feelings that immediate overall volume reductions to well below current levels would be both appropriate and possible. We considered demanding far tougher provisions such as requiring that utilities in unsited areas institute mandatory on-site storage of waste and that unsited states immediately build interim storage facilities. We also considered calling for utilities and other generators to employ "best available technologies" for volume reduction.

However, despite our conviction that far more volume reduction can be achieved, the sited states finally agreed in effect to "freeze" disposal volumes at present levels. Accordingly, the compromise package imposes a total annual volume cap of 2.8 million cubic feet for the three states.

Included within this volume cap is a 1.7 million cubic feet per year cap for all utility waste. It also includes a volume cap for each sited state at the following levels:

Washington ------ 1.4 million cubic feet
South Carolina -- 1.2 million cubic feet
Nevada----------- .2 million cubic feet

I might note that utility waste presented a special problem since a significant volume of new utility waste has been projected due to additional nuclear utility plants that are expected to come on line during the transition period. In order to help the utility industry deal with this new waste, we agreed not to demand on-site storage and volume caps at well below current levels.

Due to the projected utility waste volume increase, volume reductions by many utilities still will be necessary to keep utility waste volume at the "freeze" level of 1.7 million cubic feet per year. The package therefore includes volume allocations for utilities that will require some to reduce the amount of waste they generate and ship. We are confident that these volume reductions can be achieved.

We also developed a number of provisions and concepts to ensure fairness and flexibility for utilities in meeting these volume limitations. For example, the compromise package includes provisions that set utility allotments on an industry average and multi-year basis, permit the bartering of allotments among different utilities, etc. Since the utility industry now is supporting these provisions and the 1.7 million cubic foot per year cap on utility waste, I will not comment further on the mechanics of the legislation's volume allocations for utilities.

With respect to non-utility generators, volume reductions are to be attained through increased surcharges, which I discussed earlier. No one has been able to suggest a workable way to impose mandatory percentage volume reductions on the thousands of small non-utility generators without creating a complex new regulatory scheme. The volume of non-utility waste has significantly decreased over the last several years, probably because of recent increases in disposal charges. We do not expect this trend to change. Therefore, while we must rely on the surcharge mechanism to limit waste from these sources, we are confident that this mechanism will be adequate to limit the generation of waste by existing and new non-utility generators to within the 1.1 million cubic feet per year cap for non-utility waste.

Before moving to highlight several other key elements of the compromise package, I want to stress that the sited states consider the volume caps, including the 1.7 million cubic feet cap for utilities, to be "set in concrete" and we would adamantly oppose any increase in these levels.

Emergency Exemption Provisions

We recognize that there may be unforeseen or unusual circumstances where waste poses a serious and immediate threat to the public health and safety. In such circumstances it may be appropriate to grant emergency access to disposal facilities even though access might not otherwise be available under other provisions of the legislation. The sited states, however, consider it absolutely essential that the emergency access provisions be very tightly drawn so that they do not become a "loophole" that undermines volume reduction and the opening of new sites.

While we have no objection to allowing the Nuclear Regulatory Commission to grant emergency access, this must be done only pursuant to very stringent standards. In particular, we insist that the NRC not be able to grant access simply because it would be costly for a generator to stop producing waste or to build storage facilities or to employ volume reduction technologies. We can foresee countless situations where generators seeking additional access would claim that they have "no reasonable alternative" for handling the waste since they would have to incur substantial costs to build storage facilities, institute volume reduction procedures or take other costly action to manage their waste problem. To allow emergency access where the generator does not make diligent -- and even expensive -- efforts to handle the waste simply is unacceptable.

We also strongly believe that the state in which a generator seeking emergency access is located should be required to take appropriate actions -- such as promptly building interim storage facilities -- to ensure that renewals of emergency access are not required.

The time period for emergency access and extensions of any such grant must be limited to the minimum time necessary. In addition, we consider it essential that emergency access (including any renewals) after December 31, 1992 should not exceed a total of 180 days. Such a limitation is absolutely necessary to prevent this provision from becoming a major "loophole" for areas that delay in opening new sites.

Our concerns are best met by the emergency access provision that is included in the package as reported by the House Interior Committee. We urge your Committees to adopt that provision.

Ten-Year Congressional Review

The sited regions are unwilling to accept further postponements in the opening of new sites. Therefore, an essential element of the compromise package, which is included in the compact consent legislation, is a provision that Congress will not reopen approved compacts for a ten-year period, i.e., not until the transition to a regional disposal system is complete.

Additional Areas of Concern

While time does not permit me to highlight all elements of the compromise package, I do want to note that we are continuing to work on several issues---such as mixed waste and the three-state agreement administration provisions---that need to be considered by your Committees, and we want to work closely with you on these issues. I also want to emphasize that the sited states consider it essential that the final legislative package retain provisions that guarantee that the states retain their existing regulatory authority over site criteria and licensing. Finally, we urge you to give special attention to how additional incentives might be included to ensure the timely opening of new disposal sites and that NRC licensing proceedings can be completed expeditiously.

CONCLUSION

I hope that my summary of this compromise package has been helpful to the Subcommittees. We believe that this package provides a workable legislative solution to the difficult problem of ensuring that a fair system is established for disposing of the nation's low-level radioactive waste as envisioned in the 1980 Act.

This legislative package has been developed through a long and hard series of negotiations and compromises. Its basic concepts are carefully linked and interwoven so as to offset otherwise unacceptable provisions from the varied perspectives of sited and unsited states, waste generators and other interested parties. The package is not well liked by any any of us, but given the choices and circumstances, I firmly believe that it offers the only viable basis for resolving this issue in 1985 and preventing a crisis over low-level waste disposal.

Thank you. I would be pleased to respond to any questions you my have.

Senator EVANS. Thank you, Governor.

I guess I'd like to start with the milestones that you brought forward. You suggest that they have been softened somewhat by the House committee, that the 7 years is probably longer than is really necessary.

Have you done sufficient research within the State to tell you what you think an appropriate period really—you know, what's really necessary. Seven years is apparently a compromise or is felt by some to be necessary, but what's really necessary to get this job done?

Governor GARDNER. Originally, I think we were looking at a 4- to 5-year time period. We believe, however, that given all the ingredients that have gone into this particular negotiation, that we can live with the 7-year, but the 7-year is the longest period of time that we think is acceptable, given both the political and practical dynamic.

Senator EVANS. So that in your analysis of this, the 7 years really has a good deal of flexibility within it; that we could be shortened down, and still everyone should be able to meet even a shorter time period.

Governor GARDNER. We are convinced, in talking with other States and compact groups, that the 7 years is very realistic. The utilities would agree with that.

Senator EVANS. I'm curious. Now, with the State of Washington receiving over half the low-level waste, where is that coming from primarily from States outside the compact region?

Governor GARDNER. It's coming fairly evenly from all States, with the understanding that we're getting grades A and B primarily, and South Carolina is getting the grade C waste.

Senator EVANS. So it's really divided not geographically, but by type of waste essentially.

Governor GARDNER. That's correct.

Senator **Evans**. Page 6 of your testimony, you mention that unfortunately, the rebate is not specifically designated for site development purposes.

Do you suggest that that would be a change that would be appropriate in the legislation to be more specific in how any surcharge be used?

Governor **Gardner**. I do. And if I could back up a moment, we originally recommended higher surcharges and the rebate mechanism. Initially, the other States did not have an interest in the rebate, so we dropped that provision, and then we are now facing the situation of where we've been asked to reduce our surcharges in half, and now consider the rebate again.

We're willing to do that, but we think very strongly that those rebates ought to go toward site characterization.

Senator **Evans**. Do you feel that there is a problem—I noticed again on page 7 of your testimony, you noted that utility waste presents special problems, since a significant volume of new utility waste has been projected due to additional nuclear utility plants that are expected to come on line. We agreed not to demand onsite storage and volume caps at well below current levels.

Is there a danger with the combination of volume caps and surcharges, that some waste generators—and I would guess this is particularly the nonutility waste generators—might be tempted to find other ways to dispose of their waste, rather than go through the cost of surcharges and the problems of regulation? Are we running into the same potential problems in low-level nuclear waste that we have run into with some of the waste and tax proposals on toxic wastes and the midnight dumping that has become prevalent in some parts of the country?

Is that a danger in your view?

Governor **Gardner**. Yes; it's always a danger. It's something we hope doesn't occur. There is some precedent for that because there have been surcharges, high charges, and there has been a significant reduction in volume.

Senator **Evans**. Well, that's what I'm concerned about. Does that significant reduction in volume indicate that people are generating smaller volumes of waste, or that the same waste is being generated, but that some of it's going somewhere else?

Governor **Gardner**. Mr. Andrews would like to address that.

Senator **Evans**. Fine.

Mr. **Andrews**. Senator, I'm Wright Andrews, counsel to Washington, Nevada, and the Southeast Compact on this issue. I think as the Governor said, there is always a danger that something like that would occur. There's no way to control it absolutely, but based on what we have been told by waste generators, many generators are employing significant volume reduction procedures now, and are in fact achieving major volume reductions. Other generators are not.

With respect to the future, it is our projection that the cost of disposal at new sites in many, if not all, cases will be very, very substantial in the future; comparable, and probably higher, than the cost of disposal with these surcharges. So all of the future looks much more expensive.

Senator **Evans**. Do you feel that that is a problem that we need to somehow deal with? I'm not quite sure how to deal with it. But the more you raise charges to cover cost, and the more you raise charges to presume—and if the charges are based on volume—if that has the result of causing generators to find a way to consolidate or reduce volume, that's one thing.

If they reduce volume by deep-sixing it someplace else, that's quite another thing. Have you really examined that potential problem and have any comment on it?

Mr. **Andrews**. Senator, we haven't considered that a particular problem. We'd be happy to work with you and the staff and explore that further.

Senator **Evans**. On page 9 of your testimony, you suggest that you urge us to give special attention to how additional incentives might be included to ensure the timely opening of new disposal sites.

Do you have any more particular suggestions on the nature of those incentives and how they might be utilized? You've struck a responsive chord. I've been a long-time believer that we get further with incentives sometimes than we do with regulation or penalties.

Governor **Gardner**. Or penalties. And I would agree with that. I'm not sure. I think this is well drafted in terms of trying to anticipate all the ways in which someone could work their way around this. We are concerned particularly though that they'll meet the milestones to get up to 1992, and not have a site ready to open and run and move on the emergency provisions, and that's why we felt very strongly that there ought to be no emergency provisions beyond the 1-year extension or two 180-day extensions.

Also, the reason that we are asking that the rebates be used in the siting is that we feel that will serve as an incentive. If they don't have that option—in other words, if they just get the rebates without putting them back into the sites—then where is the incentive to push forward with the sites? That's why we've been insisting on our own that the rebates be used for that specific purpose.

Senator **Evans**. And, finally, the subcommittee—the intermediate milestones on the package that's been approved by the House subcommittee calls for each State ratifying a regional compact by July 1, 1986.

Considering the fact that we are—it's probably going to be some yet before we successfully pass and put into law any legislation, in your view, is that sufficient time for each State to proceed ahead with the sometimes tedious problem of creating an interstate compact?

We're talking essentially—you know, I would guess that we would be fortunate if we have legislation like this through Congress, signed by the President and ready to go by the first of the year. And if we do, that's 6 months.

Governor **Gardner**. Yes. I think 6 months for that particular milestone is reasonable. All the States, through the Governors Conference and others, are aware of this effort. Governors Riley, Bryan, and myself have been in constant contact through letters individually to the Governors, may I add, on both high- and low-level waste, but our belief is—unless you contradict me, Wright—is that this is a reasonable milestone. Six months for ratification is adequate.

Mr. **Anderson**. Senator, if I could just add on that. I think we have discussed this very widely with other States, as the Governor pointed out, and with compact officials, I think most, if not all. I really haven't heard any complaint on that issue. In fact, generally, I think it's my belief, after talking with a broad cross-section of people, that it would be unusual if any State cannot meet all of these milestones.

I think they are quite meetable, and therein lies the danger in the outyears. We hope that the States can meet them and be prepared to have the new sites on line at the end of 1992, and that again is why the emergency exemption provision being tight at the end is critically important to us.

Senator **Evans**. And from your work in the Governor's association, you find no opposition apparent, that people believe your colleagues in the producing but not accepting States willing to meet these deadlines?

Governor **Gardner**. They all recognize that this started in 1980; that none of them have really stepped up to the problem, and that the requests on the part of the three siting States is a reasonable request, and compromises are pretty well worked out.

Senator **Evans**. Good. Thank you very much, Governor. You've been very helpful.

[Pause.]

Senator **Evans**. In order that all members have an opportunity to present their testimony, I think I'll call the remaining three panels up together and have them in turn have an opportunity to present their testimony, and we'll get into questions of the entire panel together.

So, Mr. David Berick, Director of Nuclear Waste and Safety Project, Environmental Policy Institute; Mr. Brooks Yeager, Washington representative of the Sierra Club; Ms. Janis Stelluto, executive director of NELRAD of Boston; Mr. Alan Pasternak, technical director of CALRAD Forum; Stanley Goldsmith, Dr. Goldsmith, American College of Nuclear Physicians, Society of Nuclear Medicine; and Mr. Sherman Naymark, chairman of the Quadrex Corporation of Campbell, CA, will all come together.

We appreciate all of your being here. We will automatically include any and all of your full written statements in the record, and you are welcome to present whatever oral testimony you feel desirable, and we'll start with Mr. Berick.

STATEMENT OF DAVID BERICK, DIRECTOR, NUCLEAR WASTE AND SAFETY PROJECT, ENVIRONMENTAL POLICY INSTITUTE

Mr. **Berick**. Thank you, Mr. Chairman.

I am David Berick with the Environmental Policy Institute. With the understanding that my testimony will be placed in the record, let me just spend a couple of minutes summarizing our concerns.

I think it's important for us to look at where we are right now. We all know that whatever dates, goals, promises, wishes, dreams that were codified in the 1980 act haven't come to pass, and we're in the process right now of trying to pull together a national policy for disposing of low-level waste based upon the basic concept of regional facilities. But I think all of us are aware that that were some gaps, problems that weren't anticipated in 1980. It's our view this is the time to address those.

So as far as the committee's deliberations, I think there are really two basic tasks before the committee. The first is to balance the interest of the sited and the unsited regions.

As Senator Ford mentioned this morning, some of the regions that are now unsited used to be sited. Maxi-Flats, KY; Sheffield, IL; West Valley, NY, are problems of low-level waste sites that are real burdens to those regions of the country—the Midwest, the Northeast—that are now considered unsited. It's our view that the burden really is a shared burden and while we are certainly sensitive to the concerns of the three current host States, we think it's important to recognize that there is a lot of past history, and the problem before us now is to make sure that the next generation of sites that are brought on line are brought on line safely and rationally.

We would have to agree and commend Governor Gardner and the other Governors of Nevada and South Carolina for the long distance that they have come in trying to resolve the differences and concerns between the sited and unsited regions. And we would have to agree. We think we are very close to a final agreement and compromise on the way in which the sited and unsited regions' concerns are to be balanced.

I think at this point, we're arguing about some pretty fine details, not that those details aren't important, but we think the basic framework of the kinds of agreements that have been worked out on the House side, are well founded and really should be the basis for this committee's deliberations.

Second, there are a set of regulatory issues. Some were discussed this morning and afternoon, involving how mixed wastes are handled; make sure that we do have adequate regulatory guidance to develop alternatives to shallow land burial for those regions of the country where shallow land burial might not be feasible. There is certainly a question about how wastes are defined. The issue of below regulatory concern and, at the opposite end of the spectrum, the question of whether some of the higher activity wastes, the above class C wastes, for example, are going to be adequately protected.

One of the flaws in the legislation that is now before both sides of the Hill is that above class C waste doesn't really have a home. It is sort of being left out in an orphan category.

So briefly, we think a lot of progress is being made. We wish to reiterate that we think we're very close to the details on most of these packages, and pledge to work closely with you, Senator Evans, other members of the committee, to try to fashion a final product that we can all live with.

That concludes my statement. I'd be glad to answer any questions.

[The prepared statement of Mr. Berick follows:]

TESTIMONY OF DAVID BERICK
ON BEHALF OF THE ENVIRONMENTAL POLICY INSTITUTE
CONCERNING
LOW-LEVEL NUCLEAR WASTE DISPOSAL AND RELATED LEGISLATION
BEFORE
JOINT HEARING OF THE SENATE SUBCOMMITTEE ON NUCLEAR REGULATION AND THE SENATE SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
OCTOBER 8, 1985

ON BEHALF OF THE ENVIRONMENTAL POLICY INSTITUTE, I WANT TO THANK CHAIRMAN DOMENICI AND CHAIRMAN SIMPSON AND THE MEMBERS OF BOTH SUBCOMMITTEES FOR THE OPPORTUNITY TO APPEAR BEFORE YOU TODAY ON THE MATTER OF LOW-LEVEL NUCLEAR WASTE DISPOSAL AND S. 1517 AND S. 1578 TO AMEND THE 1980 LOW-LEVEL RADIOACTIVE WASTE POLICY ACT.

THE LEGISLATION BEFORE US TODAY ATTEMPTS TO SIDE-STEP A VERY CONTENTIOUS INTER-REGIONAL CONFLICT STEMMING FROM THE FACT THAT THERE ARE ONLY THREE COMMERCIAL DISPOSAL SITES IN THE U.S., IN SOUTH CAROLINA, NEVADA, AND WASHINGTON. WHILE WE ARE ENTIRELY SYMPATHETIC TO THE CONCERNS OF THOSE THREE STATES, WE ARE EVEN MORE CONCERNED BY THE PROSPECTS OF SITING AND PUTTING INTO OPERATION A DOZEN NEW DISPOSAL FACILITIES, IN THE NEXT SEVEN YEARS, IN ALL REGIONS EXCEPT THE NORTHWEST. IS DISPOSAL TECHNOLOGY ADEQUATE FOR ALL GEOGRAPHIC REGIONS OF THE COUNTRY? IS THE REGULATORY SYSTEM ADEQUATE TO ASSURE SAFE MANAGEMENT OF ALL WASTES GENERATED WITHIN A GIVEN REGION NO MATTER HOW LARGE OR SMALL THE VOLUME? WILL THE LARGE NUMBER OF NEW SITES BE ECONOMICALLY VIABLE? WILL STATE AND FEDERAL AGENCIES HAVE SUFFICIENT RESOURCES FOR THE TASK?

TO THE EXTENT THAT SOUTH CAROLINA, NEVADA, AND WASHINGTON HAVE A LEGITIMATE COMPLAINT OVER THE APPARENT DELAYS IN DEVELOPING THESE NEW SITES, SO DO THE REMAINING STATES HAVE REASON TO PROCEED CAUTIOUSLY AND ACCOUNTABLY IN DEVELOPING COMPACTS AND DISPOSAL FACILITIES.

AS IS NOW OBVIOUS, THE JANUARY 1, 1986 TARGET DATE FOR IMPLEMENTATION OF EXCLUSIONARY AUTHORITY CONTEMPLATED IN THE 1980 ACT WAS HOPELESSLY OPTIMISTIC. WHILE THIS 1986 DATE IS AN IMPORTANT REFERENCE POINT IN THE CURRENT DEBATE, WE DO NOT BELIEVE THAT THE ORIGINAL ACT ESTABLISHED JANUARY 1, 1986 AS A LEGAL DEADLINE FOR SHUTTING OFF ACCESS TO EXISTING SITES. THE ACT MAKES CLEAR, BECAUSE CONGRESS WAS UNCERTAIN AS TO HOW QUICKLY OR SUCCESSFULLY INTERSTATE LOW-LEVEL WASTE COMPACTS WOULD BE PUT TOGETHER, THAT NEITHER THE COMPACTS NOR THE EXCLUSIONARY AUTHORITY WOULD BE PUT IN FORCE UNTIL CONGRESS WENT THROUGH THE PROCESS WE ARE GOING THROUGH TODAY---REVIEW AND RATIFICATION OF THE COMPACTS.

WE ALSO FEEL COMPELLED TO REMIND THE COMMITTEES THAT REGIONS OF THE COUNTRY THAT ARE NOW CONSIDERED "UNSITED," AND WHO ARE CRITICIZED FOR TAKING ADVANTAGE OF THE THREE EXISTING DISPOSAL SITES IN SOUTH CAROLINA, NEVADA, AND WASHINGTON, WERE NOT ALWAYS IN THEIR PRESENT CONDITION. THE NORTHEAST AND MIDWEST WERE "SITED" REGIONS AND NOW HAVE EXPENSIVE CLOSURE AND PERPETUAL CARE OBLIGATIONS FOR MAXEY FLATS, KY; WEST VALLEY, NY; AND SHEFFIELD, IL. THE BURDEN OF LOW-LEVEL WASTE IS A SHARED BURDEN.

WE SUPPORTED THE 1980 ACT BECAUSE AT THE TIME THIS COUNTRY WAS FACING A LOW-LEVEL WASTE CRISIS; A CRISIS BROUGHT ABOUT BY THE FAILURE OF LOW-LEVEL WASTE DIPOSAL TECHNOLOGY AND THE FAILURE OF LOW-LEVEL WASTE REGULATION TO ADEQUATELY PROTECT PUBLIC HEALTH

AND SAFETY AND THE ENVIRONMENT. THREE OF THE SIX COMMERCIAL SITES WERE FORCED TO CLOSE, LEAVING THREE STATES WITH MILLIONS OF DOLLARS OF STABILIZATION AND RECLAMATION COSTS. TWO OF THE REMAINING OPERATING SITES CLOSED TEMPORARILY BECAUSE OF PROBLEMS STEMMING FROM IMPROPER SHIPMENTS.

THE 1980 ACT OFFERED THE OPPORTUNITY TO ESTABLISH A NEW GENERATION OF DISPOSAL FACILITIES IN THE FACE OF THESE SERIOUS OBSTACLES BY PUTTING THE STATES IN CHARGE AND OFFERING THEM EXCLUSIONARY AUTHORITY AS AN INCENTIVE AND THAT IS STILL THE TASK TODAY; THE CREATION OF THE NEXT GENERATION OF SITES.

THE CENTRAL PROBLEM BEFORE YOUR COMMITTEES IS TO FILL IN THE GAPS IN THE 1980 ACT AND TO ASSURE THAT A NATIONAL SYSTEM OF LOW-LEVEL WASTE MANAGEMENT WILL IN FACT EMERGE FROM THE PATCHWORK OF COMPACTS INITIATED BY THE 1980 ACT. SUCH A SYSTEM MUST ADDRESS THE OBVIOUS SEVEN OR EIGHT YEAR LEAD TIME THAT IT WILL TAKE TO PUT NEW DISPOSAL FACILITIES INTO OPERATION. IN DOING SO, CONGRESS MUST ALSO ADDRESS THE FUNDAMENTAL CHANGE THE REGIONAL SYSTEM, VESTED WITH EXCLUSIONARY AUTHORITY, WILL MAKE IN HOW LOW-LEVEL WASTES ARE MANAGED; PRINCIPALLY THAT ALL REGIONS MUST BE EQUIPPED TO HANDLE ALL TYPES AND AMOUNTS OF WASTE GENERATED WITHIN THAT REGION. CONGRESS MUST ALSO ASSURE THAT ACCESS TO THE EXISTING SITES IS PROVIDED DURING THIS TRANSITION PERIOD.

THE PROPOSALS BEFORE YOUR COMMITTEES TODAY FALL SHORT OF WHAT IS REQUIRED TO ASSURE THE RATIONAL DEVELOPMENT OF A NATIONAL SYSTEM OF NEW LOW-LEVEL DISPOSAL FACILITIES. WHEREAS BOTH BILLS RECOGNIZE THE NEED FOR A SEVEN YEAR TRANSITION PERIOD, S. 1517 LACKS THE INCLUSION OF MILESTONES NECESSARY TO ASSURE ACTION BY

UNSITED REGIONS. S. 1578, ON THE OTHER HAND, IMPOSES EXTREME AND DRACONIAN SANCTIONS FOR FAILING TO MEET MILESTONES; THE CUT-OFF OF ACCESS TO ALL GENERATORS. THIS LATTER PENALTY IS PUNISHMENT FAR IN EXCESS OF THE CRIME OF UNSITED REGIONS AND STATES--A CRIME OF BEING WARY OF REPEATING PAST MISTAKES.

THERE ARE WAYS TO ENCOURAGE AND EXPEDITE THE DEVELOPMENT OF NEW DISPOSAL SITES AND TO ASSURE THAT WE HAVE A WORKABLE, SAFE NATIONAL SYSTEM OF LOW-LEVEL WASTE MANAGEMENT, WITHOUT THREATENING PEOPLE WITH THE EQUIVALENT OF CAPITAL PUNISHMENT. IT IS OUR RECOMMENDATION AND EXPECTATION THAT THE SENATE WILL BUILD ON THE REVISIONS MADE BY THE HOUSE INTERIOR AND ENERGY & COMMERCE COMMITTEES TO H.R. 1083 WHICH EMBODIED, IN TWO EARLIER VERSIONS, THE CONCEPTS IN S. 1517 AND S. 1578. (WE BELIEVE THAT IT IS FAIR TO SAY THAT S. 1517 ESSENTIALLY REITERATES THE TRANSITION SCHEME IN H.R. 1083 AS INTRODUCED. S. 1578 IS ESSENTIALLY THE VERSION REPORTED BY THE INTERIOR SUBCOMMITTEE.)

AS PASSED BY THE SUBCOMMITTEE ON ENVIRONMENT AND ENERGY, H.R. 1083, AND NOW REFLECTED IN S. 1578, WAS SERIOUSLY DEFFICIENT AS INTERIOR COMMITTEE CHAIRMAN MORRIS UDALL ACKNOWLEDGED AT THE TIME. IN A JUNE 27TH PRESS RELEASE ANNOUNCING THE SUBCOMMITTEE ACTION, REP. UDALL ANNOUNCED AN ADDITIONAL PACKAGE OF CHANGES WHICH WOULD BE MADE TO THE BILL AT FULL COMMITTEE(ATTACHED). THE PACKAGE, WHICH WAS SUBSEQUENTLY OFFERED BY MR. UDALL AT FULL COMMITTEE AND ADOPTED, INCLUDES:

1) GRACE PERIODS WITH FINANCIAL SANCTIONS AFTER MILESTONES TO ALLOW UNSITED REGIONS AND STATES GREATER FLEXIBILITY IN MAKING THEIR SITING DECISIONS.

2) IN THE CASE OF THE 1990 MILESTONE, AN UNSITED STATE OR

REGION MAY CERTIFY THAT IT WILL EMPLOY SOME METHOD OTHER THAN CONSTRUCTION OF A DISPOSAL FACILITY TO PROVIDE CAPACITY BEYOND THE 1992 CUT-OFF. THIS CREATES THE OPTION, FOR STATES LIKE NEW YORK, TO DEFER DEVELOPMENT OF PERMANENT DISPOSAL FACILITIES AND DEVELOP INTERIM STORAGE CAPACITY PRIOR TO THE 1992 CUT-OFF WITHOUT LOSS OF ACCESS.

3) AN EMERGENCY EXEMPTION MECHANISM WHEREBY GENERATORS, OR GOVERNORS ON BEHALF OF SPECIFIC GENERATORS, COULD APPLY TO THE NUCLEAR REGULATORY COMMISSION FOR EMERGENCY DISPOSAL CAPACITY AT AN EXISTING DISPOSAL FACILITY UPON A SHOWING THAT A HEALTH AND SAFETY THREAT EXISTED BECAUSE OF A LACK OF DISPOSAL ACCESS.

4) REVISION OF THE 18 MONTH DEADLINE FOR LICENSING BY NRC OR AN AGREEMENT STATE OF NEW DISPOSAL CAPACITY TO A REQUIREMENT THAT STEPS BE TAKING TO COMPLETE THE TECHNICAL REVIEW BE COMPLETED WITHIN 15 MONTHS. THIS CHANGE REFLECTS THE UNCERTAINTY OF LICENSING UNDER THE 10 CFR PART 61 REGULATIONS, WHICH HAVE NEVER BEEN USED TO LICENSE A LOW-LEVEL DISPOSAL FACILITY, AND THE EXPECTATION THAT MANY DISPOSAL FACILITIES WILL EMPLOY A TECHNOLOGY OTHER THAN SHALLOW LAND BURIAL

OTHER IMPORTANT REFINEMENTS HAVE BEEN MADE IN THE HOUSE WHICH WE RECOMMEND TO THE SENATE INCLUDING:

1) A REVIEW OF THE ADEQUACY OF NRC DISPOSAL REGULATIONS FOR LOW-LEVEL WASTES THAT ARE HAZARDOUS BEYOND THE 100 YEAR INSTITUTIONAL CONTROL PERIOD PROVIDED IN THE NRC REGULATIONS.

2) A REBATE OF A PORTION OF THE DISPOSAL SURCHARGES TO THE GENERATING STATES AS AN INCENTIVE TO MEET MILESTONE. (IT IS OUR VIEW THAT THESE SURCHARGES SHOULD BE SPECIFICALLY EARMARKED FOR

DEVELOPMENT OF LOW-LEVEL WASTE DISPOSAL SITES AND MITIGATION OF IMPACTS TO A HOST STATE AND NOT SIMPLY BE TURNED OVER TO THE TREASURY OF A GENERATING STATE WHICH MAY HAVE NO DIRECT RESPONSIBILITY FOR DEVELOPMENT OF A REGIONAL SITE.)

3) A REQUIREMENT THAT NRC DEVELOP LICENSING CRITERIA FOR ALTERNATIVES TO SHALLOW-LAND BURIAL.

ONE AREA OF CONCERN IS THE PROSPECT OF CREATING ORPHAN CATEGORIES OF LOW-LEVEL WASTE, NOTABLY THAT PORTION OF LOW-LEVEL WASTE CLASSIFIED AS "ABOVE CLASS C" AND NOW DISPOSED AT COMMERCIAL LOW-LEVEL FACILITIES ON A CASE-BY-CASE BASIS. S. 1578 WOULD CREATE THIS ORPHAN CATEGORY BECAUSE STATE RESPONSIBILITY IS DEFINED AS ONLY COMPRISING CLASS A, B. AND C. ABOVE CLASS C WASTE WOULD CLEARLY NOT BE STATE RESPONSIBILITY, BUT IT WOULD BE "LICENSED" BY NRC, AND THEREFORE NOT LIKELY TO BE DISPOSED AT A DOE FACILILTY. THE AUTHORIZATION OF A STUDY BY DOE IN THE HANDLING OF THIS WASTE IN THE BILL IS NOT AN ADEQUATE TREATMENT OF THE PROBLEM. SIMILARLY, NATURALLY-OCCURRING AND ACCELERATOR PRODUCED WASTE(NARM) IS NOT DESIGNATED AS A STATE RESPONSIBILITY.

GIVEN THE PROGRESS MADE IN THE HOUSE AND THE DESIRE BY ALL PARTIES TO ENACT THIS COMPREHENSIVE REVISION TO THE 1980 LOW-LEVEL RADIOACTIVE WASTE POLICY ACT AS PART OF THE COMPACT RATIFICATION PROCESS, WE URGE THE SENATE TO ADOPT THESE HOUSE-DEVELOPED PROVISIONS. WE WILL BE GLAD TO RESPOND IN GREATER DETAIL TO ANY QUESTIONS THE COMMITTEES MAY HAVE CONCERNING THE SPECIFICS OF THESE HOUSE MEASURES OR ANY OTHER ASPECT OF THIS LEGISLATION.

THANK YOU AGAIN FOR THE OPPORTUNITY TO TESTIFY.

news

Committee on Interior and Insular Affairs
Morris K. Udall, Chairman

House of Representatives
Washington, D.C. 20515

FOR RELEASE: June 27, 1985

CONTACT: Ken Burton 202-225-2844
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UDALL SUBCOMMITTEE REPORTS LOW-LEVEL RADIOACTIVE INTERSTATE LEGISLATION

The Subcommittee on Energy and the Environment reported legislation today that would establish six interstate compacts for low-level radioactive waste disposal.

Congressman Morris K. Udall, D-Arizona, the subcommittee chairman, called the movement of the legislation "a first priority for me and for the Interior Committee," and said he appreciated the support shown for the action.

"I was not satisfied with all aspects of the bill as reported," Udall said. "But I have agreement from subcommittee members that we will settle some major unresolved issues in full committee."

Legislation reported today included a bill laying a framework for the interstate compacts system (H.R. 1083) and six compact bills ratified by groups of states.

Issues remaining to be resolved relate primarily to requirements states must meet in order to remain eligible for access to operating low-level waste disposal sites after the compacts' exclusionary authorities go into effect in 1986.

"States, compacts without sites, waste generators and environmental groups agree that the milestones and requirements in the current proposal are too rigid, and have expressed concern they cannot be met," Udall said. "I have been working with these groups on a new approach that I think is going to have broad support when we bring it before the full committee." The governors of the three states with operating sites have agreed in principle to the new approach.

The Udall proposal would add an extra year to the period states have to develop new disposal sites. It adjusts requirements states must meet in order to remain eligible to use the existing disposal capacity, and penalties for non-compliance with these requirements, to add flexibility to the states' site development process.

"Instead of an immediate cut-off of access to sites if a state is late to accomplish one of the milestones in the bill, there would be a grace period with financial penalties," Udall explained. "If a state gets six months or a year behind, then they would lose access to the operating disposal sites."

Governors would be allowed to certify that the state will take responsibility for waste in some alternative manner if it cannot, or chooses not to, apply for a license for a disposal facility by 1990. It is assumed states would have to assure that interim storage capacity was available for low-level waste from power reactors and medical and industrial sources under this provision.

Another major element of the package would be an authority for the Nuclear Regulatory Commission to make disposal space available as a last resort in cases where public health and safety could be threatened by compact exclusions.

"I agreed that the bill could move out of subcommittee today without these changes because of the need for action and because I am confident that we have a consensus on these principles," Udall said. "We will have a more complete amendment drafted for the bill prior to the mark-up in full committee."

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This paper made from recycled fibers.

Senator EVANS. Thank you. We'll go through the testimony of each of the panel before we get to questions.

Mr. Yeager.

STATEMENT OF BROOKS B. YEAGER, WASHINGTON REPRESENTATIVE, THE SIERRA CLUB

Mr. YEAGER. Thank you, Mr. Chairman.

In addition to my written statement, with the subcommittee's permission, I have some other documents: two resolutions of Sierra Club policy regarding low-level waste, two technical documents, including an analysis of the U.S. radioactive land fill experience by a consultant to the Sierra Club that I'd like to submit for the record.

Senator EVANS. It will be included in the record.

Mr. YEAGER. Thank you very much.

I guess I would like to echo some of the comments that Mr. Berick made. I'd like to explain that Sierra Club's interest in this matter, as you are aware, and in the issue of high-level waste disposal goes back a long way. In both those issues, high-level waste and low-level waste, we've cooperated over a long period of time with the three States that are now the hosts of the existing low-level waste sites, and I would join Mr. Berick in commending Governor Gardner's statement which I felt recognized not only the necessity of coming to a compromise on this issue, but also the real progress that's been made in consideration of H.R. 1083 in the House toward arriving at a negotiated compromise on the issues that a year ago were separating the regions on this issue and stymying the ratification of the compacts.

I have a lot of sympathy with the committee in considering this, because although I've brought you two resolutions of Sierra Club policy, if I brought you all the drafts of Sierra Club policy that we've gone through to get to these two resolutions, I think you'd be very amused. Because we are a 350,000-member volunteer organization, with members not only in Washington and South Carolina and Nevada, but also in New York and Illinois and in every other State, we had to go through something like the process that Congress is going through to come up with a policy on this.

Senator EVANS. I hope not.

Mr. YEAGER. The two basic goals of the policy we have come up with are that we believe it's correct to end reliance on the three existing sites; that there ought to be a certain drop-dead date by which we do that; that we feel that the end of 1992 represents probably the most realistic possible accommodation of the needs of both the sited States and the unsited regions in that respect; but at the same time, it's very important to prevent the mistakes of the past as we go about the process of siting the new generation of the low-level waste disposal facilities.

And in order to do that, I think Congress can play an important role. Earlier this morning, there was an interesting discussion involving Senator Domenici particularly, in which he asked the representatives of the Department of Energy and the NRC and the EPA what their opinions were of the reasons why the unsited regions had not yet come forward and developed new sites. And they deferred and said that maybe he ought to ask the Governors of the unsited States—very diplomatic.

But there seemed to be an indication that maybe this is a discipline problem, sort of like juvenile delinquency. You know, the real issue is, have the rules been tight enough? Has the pressure been high enough? Have the penalties for noncompliance been strong enough?

And I think in our view, there is some of that element, but there's also another element that we feel is very important for the Congress to look at, which is that there have been both practical and institutional roadblocks to developing new sites. And one of the things that we are interested in doing and that we believe this legislation offers Congress a vehicle to do is to eliminate some of those roadblocks. And I'd like to discuss just three of those briefly.

We believe conventional, shallow-land burial has failed as an effective isolation mechanism, particularly in humid environments. The three closed sites have been mentioned today by Senator Ford as an example of that, and we believe that they represent a real legacy that has made it difficult, and legitimately so, to site shallow-land burial sites in the Northeast or the Midwest.

Despite that fact, the NRC continues to believe and use shallow land burial as its reference mechanism for all its regulations in this matter. The fact that NRC has not been willing to come up to speed, and despite their protestations has not moved forward adequately toward developing criteria and guidelines for disposal techniques other than shallow land burial, has been a real problem for States like Maine, who is here today, and Illinois, that want to move toward something else.

At the same time, we believe the current regulatory classification of low-level waste, that is, the definition in law or in the regulations, is somewhat of a problem. As currently defined, low-level waste is a very heterogenous category. It doesn't just include the gloves and booties that have been mentioned earlier, but it also includes decommissioning products from nuclear reactors.

Some of those products, we don't even know what they look like yet and how long-lived their activities may be. And I think that citizens in localities generally have some legitimate worries about whether the most long-lived of those hazards should be placed in any kind of temporary disposal facility with a physical lifetime of 100 to 200 years and an institutional lifetime of somewhat longer than that.

The third problem has been that as the regional compacts have developed, it's been apparent that they're kind of—they're curious animals from the point of view of a number of issues that have to do with legal procedures. The one that we're most concerned with—there has been a very good report on this from CRS—but the one that we're most concerned with is the issue of accountability and procedural accountability, and it's apparent that the compacts have very differing rules and bylaws with regard to their openness to the public, the ability of the public to obtain documents, to be at meetings, that kind of thing; and that that has presented somewhat of an obstacle to the formation of compacts.

I would like to just suggest that the House has gone a long way toward dealing with some of these problems, and I guess I would urge your favorable consideration for some of the things that they've done to try to deal with these things.

I won't mention the issues on the schedule, except to say that the section 5 schedule and the miles, as negotiated in the House and as mentioned by Governor Gardner, was really the product of a quite protracted negotiation over on the House side. It was sort of like the Salt II talks for a while, and it came out very well, I think, in general. A lot of movement was made by both sides, and I think that that does represent a genuine compromise that ought to be kept, particularly as it's been refined in the Energy and Commerce Subcommittee.

But on the issues I mentioned, I think that the House has made a number of improvements. For one thing, the NRC has been instructed to promulgate criteria for licensing alternative disposal technologies, and they've been given 12 months to do so. I think they need exactly that kind of two by four to make them get off the dime on this.

The NRC has also been required to review its current waste disposal regulations, to examine particularly longer-lived materials which pose a hazard beyond the life of the proposed disposal facilities, and to propose new regulations if they are deemed necessary for the safe disposal of such materials.

That kind of requirement for NRC review, we believe, is extremely important in order to convince concerned citizens that the facilities that are being designed for the next generation will adequately accommodate the sort of broad range of materials that may be disposed of.

Finally, the House eliminated language that was earlier endorsed by the representative of the utility groups which would have arbitrarily constrained the period of NRC review and agreement States review for disposal facilities. In our opinion, that kind of language is killer language. It would not only make the progress of the bill substantially more difficult, but it would also make the actual licensing of these facilities more difficult, because ultimately a licensing arena is an arena in which a citizenry, a local community, or a county can be convinced and can convince themselves that a proposed facility is safe.

If you cut down the size of that hurdle, if you say, well, I'm sorry, you only have 18 months and there's no hearing, and there really isn't quite adequate time for staff review, but we've got to get it done fast, no citizenry worth its salt is going to be convinced that that's going to be safe.

So I think it's self-defeating for the utilities or for anyone else who wants to get facilities on line to endorse those kind of arbitrary constraints.

I want to thank you for the opportunity to testify, and urge you to take a careful look with the rest of the committee at what we believe are genuine improvements made in the House versions of these bills.

Thank you very much.

[The prepared statement of Mr. Yeager follows:]

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STATEMENT OF BROOKS B. YEAGER
WASHINGTON REPRESENTATIVE
ON BEHALF OF THE SIERRA CLUB

REGARDING S. 1517, S. 1578, AND OTHER LEGISLATION
CONCERNING THE DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE

BEFORE THE SUBCOMMITTEES ON ENERGY RESEARCH AND DEVELOPMENT AND
NUCLEAR REGULATION
HONORABLE PETE V. DOMENICI AND ALAN K. SIMPSON, CHAIRMEN
OCTOBER 8, 1985

"When we try to pick out anything by itself, we find it hitched to everything else in the universe." *John Muir*
National Headquarters: 530 Bush Street, San Francisco, California 94108 (415) 981-8634

I want to thank the Subcommittees and the Chairmen for the opportunity to appear here today. I can assure you that the Sierra Club approaches this most serious issue from a perspective that acknowledges the need to provide facilities to safely manage "low-level" radioactive waste produced in this country.

The Sierra Club's policy concerning so-called 'low-level' radioactive waste has evolved over a number of years as the Club has become increasingly involved at regional, state, and local levels in dealing with existing low-level waste problems. Club entities have also been active in various states' attempts to set up new institutional arrangements for low-level waste disposal under the provisions of the Low-Level Radioactive Waste Policy Act of 1980 (LLRWPA).

In May 1983, the Sierra Club Board of Directors, concerned by evidence of the failure of past landfills such as the West Valley, N.Y. facility, adopted a policy urging reductions in the generation of low-level waste and criticizing the viability of conventional shallow-land burial as a disposal option.

After considerable discussion among the various Chapter and regional leaders involved in the state-by-state process of setting up disposal compacts under the LLRWPA, the Board adopted a more detailed policy in December, 1984 regarding the compacts and the regulatory regime under which states and compacts are expected to site the next generation of low-level waste facilities.

There is a broad and serious interest in the safe, environmentally sound disposition of low-level waste within the membership of the Sierra Club. Our members and chapters have been involved in crafting state legislation on this issue, in working with compact commissions in several regions, in technical research regarding disposal options, and in dealing with the various regulatory agencies. In some states, Sierra Club members have been instrumental in the evolution of state and local policy on the subject. Because the experience of the Sierra Club membership is so varied, and because the inevitable regional divisions of interest on the issue are reflected within the Sierra Club as well, arriving at a national policy has been a fascinating and educational process.

I would like to submit copies of the two pertinent Sierra Club Board resolutions for the record. Briefly, in the view of the Sierra Club:

1) Conventional shallow-land burial has failed as an effective isolation mechanism for low-level radioactive waste, particularly in humid environments. Despite this history of failure and consequent environmental problems at Sheffield, Maxey Flats, and West Valley, shallow-land burial remains the reference technology for federal regulators;

2) The current regulatory classification of 'low-level waste', as defined by the Nuclear Regulatory Commission, is inadequate in several important respects. As currently defined, 'low-level waste' is a heterogeneous category which includes substances and materials whose hazardous life can reasonably be expected to outlive the facilities and institutional arrangements currently utilized for disposal;

3) The system of regional compacts and state responsibility for low-level waste disposal contemplated by the LLRWPA can provide a framework in which citizens can work for the safe isolation of low-level waste. However, many of the compacts offered for consideration so far fail, in key respects, to include provisions to assure adequate public involvement and environmental safety.

It is apparent that without interregional negotiations and accompanying legislative action on the issue of when and how compacts containing operating sites may phase out imports of waste from non-sited regions, no compacts will be ratified. We believe that the legislative resolution of this and other problems in the implementation of the Act offers Congress the opportunity to improve the safety and public acceptability of the national effort to manage low-level waste and to address the concerns we have cited with the current management system.

As you are no doubt aware, considerable progress has already been made in resolving the issues which have up 'till now prevented the ratification of the seven compacts currently pending before the Congress. Both S. 1517 and S. 1578 contain important steps towards the solution of these problems. In particular, S. 1578, a version of the legislation originally introduced by Interior Chairman Udall in the House, appears to be an appropriate vehicle for the resolution of many of the issues currently hobbling low-level waste management.

However, as introduced, these bills offer only incomplete solutions to some key problems, and fail to confront several important issues. In particular, S. 1578, as introduced, apears to be virtually identical to the version of H.R. 1083 approved by the House Subcommittee on Energy and the Environment on June 27 of this year. That version, while it contained some significant improvements over earlier drafts of the bill, has since been superseded and substantially improved during consideration in the full House Interior Committee, and, most recently, further refined by the Subcommittee on Energy Conservation and Power of the Energy and Commerce Committee.

The improvements in this legislation made in the House are largely the result of a long series of protracted, but worthwhile negotiations among many of the interested parties. In particular, I would like to note the improvements in Section 5 of H.R. 1083, the section which defines the schedule and milestones for progress in new facility siting which will be binding on the unsited states during the so-called "transition" period.

As approved by the Energy Conservation and Power Subcommittee, the new "improved" H.R. 1083 includes the following changes, all of which we believe will be helpful in attaining real progress towards the next generation of low-level waste management facilities:

- The schedule for developing new facilities has been extended in an attempt to accommodate the realistic siting needs of the unsited regions. The ultimate "drop-dead" date, by which time interregional reliance on the three existing sites must be terminated, has been extended by one year, to December 31, 1992. This extension is also reflected in the two bills before the Senate.

- Additional flexibility has been added to the schedule of internal milestones which must be achieved by unsited states. In particular, the 1990 milestone, which previously consisted of a simple requirement for the submission of a license application, has been improved by allowing instead a Governor's certification that the state's responsibility for disposition of LLW will be executed as of the 1991 termination date, and the submission of a plan by which such state intentions are to be accomplished.

- The mechanisms by which the milestones are to be enforced are substantially improved. In the Subcommittee version of H.R. 1083, and in S. 1578, failure to meet a milestone is punished by the immediate loss of access, presumably for all generators in the delinquent state, to the existing interim disposal facilities. The consequences of such a penalty are so severe that the threat of its imposition would likely cause a "panic" in the siting process of unsited states and regions, even where they are making legitimate good faith efforts to develop new disposal facilities. It would be very difficult, under the threat of loss of access and the subsequent closure of hospitals and medical labs, for a local community or county to raise potentially legitimate questions about the choice of site, design, or other pertinent questions regarding a proposed LLW disposal facility.

Responding to this concern, the House has added "grace periods" after each milestone, during which the delinquent state would be subject to increased surcharges, which would be designed to encourage timely compliance. Only after the expiration of these grace periods would the offending state lose access to existing disposal. We support this compromise position, which we believe fulfills the need of the sited states for stiff incentives to force progress in unsited regions, while avoiding the creation of unnecessary public health crises in the unsited states, or the trampling of legitimate citizen concerns in the siting process for new facilities.

* Arbitrary constraints on the licensing and health and safety reviews of proposed LLW facilities have been eliminated. Language has been added to encourage expeditious action by the NRC and agreement state regulators. The language eliminated by the House committees appears in Section 10 of S. 1578. As presently written, it arbitrarily constrains the NRC's ability to conduct careful environmental and health and safety reviews of new LLW facilities, and threatens the integrity of a critical licensing process. We believe such language is both unwise and counterproductive, in that it will undermine the only process through which concerned citizens and local communities can assure themselves of the safety and adequacy of proposed facilities.

• The NRC has been instructed to promulgate criteria for licensing alternative disposal technologies. This requirement, which is also reflected in S. 1578, represents a substantial step towards ending the Commission's current addiction to shallow-land burial, a technology which, in many regions of the country, is now considered to be a mistake of the past which no one intends to repeat. I should note, in this context, that the provisions in S. 1517 which call for the federal technical assistance to the states in developing alternative storage technologies are a good complementary step to these instructions to the Commission.

• The NRC has also been required to review its current waste disposal regulations, to examine particularly the longer-lived materials which may pose a hazard beyond the life of the proposed disposal facilities, and to propose such regulations as may be necessary for the safe disposal of such materials. This requirement is a key to addressing the legitimate concerns of citizens and local communities concerning the longer-lived radioactive materials which are now classified as low-level waste. The presence of these materials in the LLW stream has, up till now, been a major stumbling block to the development of new facilities for LLW disposal.

We believe Congress should assure itself that, as a general rule, any substances consigned to state responsibility under the Act will decay to harmless levels within the expected physical lifetime of facilities and technologies currently available for disposal. Substances with longer hazardous lives than can be safely accommodated by available technical and institutional arrangements should remain a federal responsibility and be dealt with in the context of the national high-level waste management program. Although we are primarily concerned that the so-called 'low-level' waste category not remain a catchall containing highly concentrated and long-lived radionuclides, we also urge the

Committee to avoid the establishment of 'orphan' waste categories not subject to regulation under other federal law.

The Sierra Club endorses the improvements in H.R. 1083 made by the House committees, and encourages the Senate, during its deliberations on LLW legislation, to consider them favorably. However, there are several important issues which have not been resolved by the House, which we would also urge the Senate to consider.

The compacts established by the states under the terms of the LLRWPA vary in the degree to which they assure public participation and environmental safety in the siting of new facilities for LLW disposal. Although we understand the Congress' reluctance to meddle in affairs which have been delegated to state responsibility, we also believe that it is appropriate for Congress to establish general requirements as to how the compacts will be treated under existing federal administrative law. In this context, we urge the Senate to consider a generic requirement that the compacts be subject to applicable statutes governing federal administrative procedure, such as the Administrative Procedures Act, the Freedom of Information Act, and the Government in the Sunshine Act, as if they were agencies of the Federal Government.

Section 6 of S. 1578 takes an important step towards requiring environmentally sound institutional arrangements for LLW disposal by requiring the establishment of extended care funds for disposal facilities sited under the Act. We believe such funds should be supplemented by long-term liability funds to compensate for potential personal injury and property damage due to any leakage or failure of such facilities, and by a requirement for the provision of maximum available liability insurance. We do not support any artificial limit on the amount of compensation which would be available to private parties in case of accident.

The House Committees have been wrestling for some time with the issue raised by U.S. Ecology concerning dual regulation, by the NRC and the EPA, of commercial waste disposal facilities which also contain hazardous, or mixed hazardous and radioactive materials. Early on, we opposed attempts to eliminate EPA jurisdiction in such cases. Although a company has a right to be free from contradictory regulatory demands, there is no clear advantage to centralizing all regulatory actions in one agency, particularly where that agency lacks expertise in the new areas it is supposed to administer. It is clear that EPA has the expertise in hazardous waste regulation which NRC lacks, and we believe its authority under RCRA should continue to be exercised. We anticipate that a constructive resolution of this problem will be achieved in the full House Energy and Commerce Committee.

Mr. Chairman, we are grateful to you for the opportunity to present our concerns on this issue before you today. I believe we share the goal of assisting in the establishment of a safe, environmentally acceptable management system for so-called 'low-level' radioactive waste. We look forward to working with you as the Senate considers this important issue.

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SIERRA CLUB
NORTHEAST REGIONAL CONSERVATION COMMITTEE

May 6, 1983

PROPOSED NATIONAL POLICY ON LOW-LEVEL RADIOACTIVE WASTE

1. The generation of low-level radioactive waste must be reduced.

2. Choice of management and isolation options must be based on half-life, curie content, and chemical and physical composition of the waste. Short-lived wastes should be stored on or near the site of generation, wherever possible.

3. Monitoring and isolation of the waste must continue for the duration of their active life.

4. Health and environmental considerations must be top priority in the siting and operation of any storage, volume reduction, and isolation facility. Geologic, hydrogeologic, climatic, seismic, and other environmental factors must be carefully evaluated. Shallow land burial has not met these criteria.

5. Volume of waste should be reduced prior to isolation provided that reduction techniques have been carefully evaluated for their potential environmental and health impacts.

6. Ongoing research efforts should seek to improve methods of waste reduction and isolation. Meanwhile, the safest methods of temporary storage should be evaluated and utilized.

7. The full cost of low-level radioactive waste isolation and monitoring should be borne by the generators of the waste.

8. Public participation in the formulation of all low-level waste management and isolation plans should be required.

9. New definitions should be written that establish low-level radioactive waste as having a hazardous life no greater than the 100 year institutional control period required by the Nuclear Regulatory Commission.

Voted May 7, 1983, by
National Sierra Club Board

9. Addition to Low-Level Radioactive Waste Policy — Regional Compacts

Jess Riley, __________, explained that this addition to the low-Level Radioactive Waste Policy offers definitions of wastes and activates regional attention. The RVP forum has suggested that item #11 be deleted. Riley recommended replacing the word appointment with "petition." This would provide a handle on the commission structure which is the 3rd level of authority in the United States. Carolee Baudler reported that the RVP forum did not have the opportunity to discuss this alternate wording but felt it would be acceptable though it might not be feasible in every situation. Riley that petitions could be circulated to gather the minimum number of signatures and then be presented to the proper authority.

MSC (Brower-Taylor) The Sierra Club believes that the current statutory and

regulatory system for the disposal of so-called "low-level radioactive waste" under the provisions of the Low-Level Radioactive Waste Policy Act fails to provide adequately for their safe and ecologically sound confinement.

A. The Sierra Club urges Congress and the appropriate regulatory agencies to correct the deficiencies in the present definition of "low-level waste," and to correct the shortcomings in specific multi-state compacts, by amending the act, or by adopting appropriate language at the time of compact ratification, to:

(1) Provide uniform, precise definitions and handling methods of those radioactive wastes not presently defined as "high-level," in accordance with these criteria:

(a) Wastes with a hazardous life* of less than one year shall be stored at the place of use or distribution until not hazardous.

/(b) Wastes with hazardous lives between one and 100 years** shall be stored in appropriate licensed facilities. No such waste shall contain more than 10 nanocuries per gram of transuranic elements. It shall be impermissible to deliberately reduce the concentrations of radioactive wastes by dilution of the process stream.

(c) Radioactive waste with a hazardous life of more than 100 years must be treated as "high-level" unless it can be demonstrated to a high degree of confidence that such waste can be safely isolated for its full hazardous life and that there is a high degree of confidence that the necessary institutions and contractual arrangements can be maintained for the full isolation period.

(2) Ensure continued disposal capability, consistent with the overall objective of phasing out reliance on existing shallow land burial sites, by limiting the authority granted to ratified compacts to exclude out-of-compact wastes after January 1, 1986.

(3) Encourage federal sponsorship of further research to develop engineered, site-specific waste isolation techniques which will have the necessary water impermeability and structural resistance to seismic events to ensure safe isolation of the stored wastes for their full hazardous lives.

(4) Prohibit the sea dumping of radioactive wastes.

B. The Sierra Club believes that regional compacts should include, to the maximum extent possible, the following provisions:

(1) Promote source and volume reduction of radioactive waste streams, consistent with environmental quality.

Prohibit unlined soil-trench burial, and require the use of engineered facilities and alternative isolation technologies providing greater and safer confinement than present shallow land burial.

(3) Require an Extended Care Fund, paid for by charges imposed on generators, to cover the costs of site clean-up, decommissioning, and long-term monitoring.

(4) Require a Long-Term Liability Fund, paid for by charges imposed on generators, to compensate for personal injury and property damage in the event of leakage and to provide the maximum third party liability insurance.

(5) Establish a fair and equitable mechanism for sharing liability not covered by insurance or the Extended Care and Long-Term Liability funds among the party states (except when such liability arises from malfeasance).

(6) Base disposal fees on both volume and radioactive hazard — kind and amount of radioactive substances.

(7) Plan for monitoring the sites for the entire hazardous life of the content.

(8) Provide appropriate public participation through public notification of meetings, open meetings, access to documents, and procedures in conformity with the federal Administrative Procedures Act.

(9) Provide assurance that state health, siting and other environmental laws more stringent than federal law or compact provision are not preempted.

(10) Prohibit compact commissions from accepting private grants or donations.

(11) Provide petition and recall procedures for compact commissioners.

(12) Require an environmental impact statement for each regional radioactive waste storage facility.

(13) Facilitate compliance with compact guidelines and regulations by the enactment of strong, clearly defined penalties and disincentives for compliance failure by generators, transporters, and radioactive waste storage facility operators.

C. The Club, through its chapters and regional conservation committees, will work to improve existing multi-state compacts, or to develop new compacts or appropriate single-state arrangements, to achieve the above goals.

Definitions

*Hazardous life -- the time required for the concentration of radioactive materials within a package to decay to the maximum permissible concentrations given in 10 CFR 20, App. B, Table II.

**100 years -- the institutional control period set in 10 CFR 61.59(b). This is consistent with low-level radioactive waste policy already established by the BOD.

All were in favor.

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U.S. RADIOACTIVE LANDFILL EXPERIENCE

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INTRODUCTION

Let me thank the Convenors, Andy Blowers and David Pepper, for putting together this thought provoking session, "Geography, Politics and Planning for the Nuclear State." This interchange of ideas will be very useful to all of us.

Radioactive waste issues have been very heated in the United States, and the Sierra Club, the national environmental organization with over 350,000 members for whom I work, has been very much involved on a local, state and federal level. Leaving aside uranium mill tailings and plutonium-contaminated waste, commercial radioactive waste is classified as either high level or low level in the United States. This paper deals only with so called "low-level" waste, the experience at radioactive landfills and future directions.

High level waste is essentially irradiated nuclear fuel, the liquid or solidified fission products from processing this nuclear fuel to extract plutonium, and whatever else the Nuclear Regulatory Commission (NRC) classifies as high level. "Low-level" is everything that is not high-level, so it is defined by what it isn't. In England, your category, intermediate level waste, much of which goes to the Drigg landfill, is included in the "low-level" waste category in the United States. Under the Nuclear Waste Policy Act of 1982, legislation enacted by the U.S. Congress, the federal government, primarily the Department of Energy (DOE), is responsible for safe disposal of high level waste. DOE is in the process of locating a deep underground repository, is intensively investigating sites in the South and West, and hopes to find, license, and operate such a site by the year 1998. The NRC will license the facility. This repository will also accept solidified high level waste from the military, and a defunct commercial reprocessing plant at West Valley, New York. As you can imagine, no community or state is thrilled with the prospects of being neighbor to 158 billion Ci. The issues involve not only whether the earth, 1000' to 3000' feet underground, can contain this much radioactivity for one million years or so without releasing it, but transportation of high level waste to the repository site. Transportation impacts would obviously be more immediate and impact citizens over a much larger geographical area than the repository itself.

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From our perspective, we strongly support finding a permanent home for these highly radioactive materials, but believe the schedule, mandated by Congress, is much too ambitious to carry out a scientifically responsible program. In any case, numerous procedural obstacles will delay repository operation till well after the year 2000.

Under the Low Level Radioactive Waste Act of 1980, Congress passed the responsibility for managing "low-level" waste back to the States. Congress encouraged the States to form regional agreements to find common regional waste facilities. The LLRWA set a deadline of January 1986 for each region to locate and operate a waste facility. For good reason, no region or state will meet this deadline. Because of the poor past performance of radioactive and toxic chemical landfills in the Northeast and Midwest, there is much resistance to again siting radioactive landfills in these regions. Based on past performance, the NRC promulgated new regulations to site radioactive landfills, but no one is queuing up. After detailing this experience, I will go on to discuss the implications and future trends.

WHAT IS "LOW-LEVEL" WASTE?

Since "low-level" waste is everything that is not high level, there is a broad spectrum of materials ranging from mildly contaminated booties, clothing and test tubes, to intensely radioactive industrial and utility waste, with exposure rates on the order of several thousand rems per hour. Some "low-level" waste has greater specific radioactivity than liquid high level waste at federal reprocessing plants. If it were all booties, or medical waste, as the nuclear industry would have you believe, we would have a non-problem.

The origins of "low-level" waste, by sector, in terms of volume and Curie content, are shown in Table 1. The sectors comprise reactor, institutional (medical and research), industrial and government waste generators. As we see, reactor waste accounts for 24% of the radioactivity sent to radioactive landfills (DOE, 1983). Over 95% of the radioactivity in reactor waste is in irradiated components and reactor coolant purification media, that is, sludges and resins (Sierra Club, 1984). The dominant radionuclides are cobalt-60 and cesium-137, with half-lives on the order of 5 and 30 years, respectively. An average reactor produces about 500 Ci of cesium-137 per year; eighty operating reactors therefore produce about 40,000 Ci per year which are sent to radioactive landfills. The more voluminous dry reactor wastes are slightly contaminated, comprise only 5% of the radioactivity, and can be greatly compacted.

Industrial waste accounts for 73% of the "low-level" radio-activity going to landfills. In this category fall two large producers of isotopes for medical and research purposes: New England Nuclear (Massachusetts) and Union Carbide (New York), which respectively account for 24% and 15% of the total "low-level" waste radioactivity (NRC, 1982a) and (NRC, 1982b). Industrial waste also arises from radionuclides used by well drillers and radiographers.

Institutional waste, from hospitals and research institutions, accounts for about one-third of the volume of waste going to radioactive landfills, but less than 1% of the radioactivity. Medical waste is dominated by the short-lived technetium-99m, while research waste consists of carbon-14 and tritium, with half-lives of 5,000 years and 12 years, respectively.

COMMERCIAL RADIOACTIVE LANDFILL EXPERIENCE

Of six commercial radioactive landfills which have operated in the United States, three are now closed because of problems: Maxey Flats, Kentucky; West Valley, New York; and Sheffield, Illinois. All three have had water infiltration into trenches, subsidence of trench covers and erosion. At each site, radioactivity has migrated and expensive remedial actions are continuing. One of the major operating radioactive landfills for the country, Barnwell, South Carolina, is located in a high rainfall area. It has not had buildup of radioactive leachate because of the porous, sandy trench bottom which allows radioactive water to drain out. The other operating sites, in Beatty, Nevada and Richland, Washington, both located in semi-arid regions, have apparently not had the same problems as at the more humid sites. Fig. 1 shows the geographical location of these waste sites.

MAXEY FLATS

Background

Maxey Flats is located in northeastern Kentucky, about 65 miles east of Lexington. The Maxey Flats Disposal Site is sited on a flat-topped ridge known as Maxey Flats (see Fig. 2). The 300 acre site, including a restricted access area of 42 acres, 25 of which contain low-level waste, operated from 1963 to 1977. The land was originally purchased in 1962 by Nuclear Engineering Co. (NECO), then sold to the State of Kentucky who granted a 25 year lease to NECO. Wastes are disposed of in 48 trenches, plus hot wells and special pits. The unlined trenches, carved out of dark blue to greenish shale and fine-grained sandstone, are 5 to 210 m in length, 3 to 22 m in width and 3 to 10 m in depth (Mills, 1983), with covers 0.3 to 5 m thick. The average annual precipitation is 46". The site is cut by, and sits 300' to 400' above, tributaries of the Licking River which feeds into the Ohio, the water supply for over one-half million people. A total of 4.75 million cubic feet of radioactive materials were buried at Maxey Flats, with a total radioactivity of 2.25 million curies, including 64 kilograms of plutonium.

Because of the low permeability of the surrounding earth, water entering the more permeable trench caps, accumulates and eventually fills the trenches, mixing with the burial materials and becoming radioactively contaminated. By 1972, over one million gallons of water had accumulated in the trenches. In 1973, an evaporation system was installed. Trench water was pumped into tanks, evaporated and the resulting sludges were stored in a tank on-site. In 1975, the U.S. Environmental Protection Agency, following up on a state report on the migration of plutonium, concluded, "The burial site was expected to retain the buried plutonium for its hazardous lifetime, but the plutonium has migrated from the site in less than ten years." "If 100% retention of a waste...is the goal of shallow land disposal, continued burial of plutonium in humid climates using present waste forms, containers and trench construction methods will not achieve the goal (Meyer, 1975)." While US Ecology, formerly called NECO, claimed that subsurface migration of plutonium was impossible, the EPA found plutonium approximately three feet deep in core drilling samples. Plutonium was also found in surface soil, monitoring wells and drainage streams. Subsurface migration of radionuclides other than tritium has not been extensive compared to trench water concentrations. Tritium, probably from the evaporator plume, was detected in domestic well water. Milk samples, from cows within 3.1 km of the site, drinking water from Rock Lick Creek, showed higher tritium levels.

In 1977, the detection of cobalt-60 and manganese-54 in a seep in newly opened trench 46, led to closing of the Maxey Flats landfill. The State of Kentucky purchased the lease rights from NECO for $1.2 million, and now maintains the site. As the trench caps subsided, about 2 million gallons of water per year began entering the trenches. The evaporator processed 1.2 million gallons, its maximum capacity, and an excess of 800,000 gallons remained in the trenches and on-site tanks. Finally, as a temporary remedial measure, in November 1981, the State covered three quarters of the trenches with 15 mil PVC. The polymer membrane was covered with a geotextile material for structural strength and 45 cm of earth to protect against weathering.

Site Condition

The principal pathway for water in-migration appears to be through the trench caps. Since the site is located on a plateau, subsurface migration is probably minimal. With the plastic cover installed, the annual one meter rise in trench water was reduced to 0.3 meters, but not eliminated. Apparently small rocks and the movement of heavy equipment over the membrane, created holes and pathways for water inmigration. Additional settling of the trench cover due to the deterioration of waste containers also degraded the membrane (Mills, 1983). Even 20 years was not sufficient time, apparently, for the cover to completely settle. Though water migration through the trench caps is the primary mode of trench recharge, subsurface migration still exists through the more permeable sandstone strata. Pumpage in one trench causes drawdown in the other trenches indicating that the burial trenches are hydraulically connected. Fracture flow appears to take place in vertical joints and in the sandstone strata (O'Donnell, 1983). Water tables exist at depths of 25 and 300 feet, respectively (Fischer, 1983).

Analysis of trench water (Dayal, 1983) shows tritium and dissolved cobalt-60, cesium-137, strontium-90 and plutonium. The chelating agent EDTA forms complexes with these normally insoluble radionuclides. EDTA levels as low as 2 ppm result in 95% cobalt-60 in solution (Dayal, 1983). Tritium is the most abundant radionuclide, with levels ranging to 5.5 x 10^9 pCi/L or 1830 times off-site maximum permissible concentrations (MPC). Following tritium, the most abundant radionuclide is strontium-90, with levels ranging up to 3 x 10^5 pCi/L, or 1000 times off-site maximum permissible concentrations.

Tritium has migrated outside the restricted area, but apparently not yet off-site. It is the only radionuclide detected in test wells, but not monitoring wells which ring the perimeter. Since transport from the trenches takes place in fractures, monitoring wells would have to be precisely located in fractures to detect radionuclide migration (Fischer, 1983). According to the US Geological Survey, tritium is migrating at the rate of 50 feet per year (O'Donnell, 1983). Tritium has been detected in the sap of nearby maple trees, but it is not clear whether it is due to the evaporator or subsurface migration. Sampling of trees was done March 1983; with the plastic cover in place, the evaporator was shut down December 1982. Tritium levels in the sap of maple trees has ranged from 10,000 to 290,000 pCi/L, the latter levels, 10% of MPC, from trees 500 m from the site and closest to a trench containing 300,000 Ci of tritium. A total of 600,000 Ci of tritium is buried at Maxey Flats. As a control, trees growing 20 km from the site have tritium levels on the order of 1,000 pCi/L (Rickard, 1983).

Since 1978, the State of Kentucky has spent about $7 million at Maxey Flats. Contracts with a geological firm, and the purchase of the lease from NECO, amounted to $2 million. The State further estimates that it costs about $1 million per year to maintain the site. Research and development costs are additionally paid by federal agencies, particularly the Nuclear Regulatory Commission and the Department of Energy.

Decommissioning plans have recently been formulated by the State of Kentucky (Kentucky, 1984). Eighty thousand gallons of evaporator sludges stored in the tank farm will have to be solidified. To minimize further settling, the trench caps would be deep compacted, then covered with asphalt, cement or vegetation to prevent water infiltration to the trenches. Lateral ground water flow would be eliminated with a cut-off trench about the perimeter of the site. Excluding project management costs and contingencies, decommissioning costs range from $52 million to $121 million. These figures assume that the land reverts to unrestricted use after 100 years. As of 1978, $250,000 had been put aside in a perpetual care fund (EGG, 1983c). If it indeed costs $121 million to decommission the site, this is equivalent to $60 per cubic foot of waste material buried there. It is interesting to compare this real cost to the ideal long-term care and closure stabilization costs of $2 per cubic foot quoted by a DOE contractor for a site of equivalent size (EGG, 1983b). Obviously, DOE is anticipating that past problems will not be repeated at future radioactive landfills. In addition to these decommissioning costs, the State of Kentucky intends to purchase a buffer zone about the site.

SHEFFIELD

Background

The California Nuclear Company and Illinois Department of Health signed a lease agreement October 2, 1966 permitting the establishment of a low-level radioactive waste disposal site near Sheffield, Illinois, in Bureau County, about 50 miles north of Peoria. The site is owned by the Department of Nuclear Safety on behalf of the State of Illinois, and, unlike the other commercial radioactive landfills in the United States, is directly licensed by the NRC. The burial of radioactive waste was first authorized on August 1, 1967. NECO, now called US Ecology, the same site operator as at Maxey Flats, Ky., succeeded the original lessee March 19, 1968 (NRC, 1981). The 20 acre site is in a region of abandoned coal mines, and is bordered to the north by rolling terrain and the / 40-acre NECO hazardous waste disposal site, on the Superfund list of the Environmental Protection Agency. The temperature in this Midwest region varies between -10°F and 90°F, with frost depths ranging from three to four feet. Precipitation averages 35" per year. The water table varies from 15' to 45' below the ground surface.

In ten years of operation, three million cubic feet of waste containing 60,000 Ci by-product material, 55 kg of special nuclear material (Pu and U-235), and 600,000 pounds of source material, were buried in 21 trenches (NRC, 1981). These wastes were dumped haphazardly to 3' of grade and the trench was then backfilled and contoured to aid water runoff. No detailed inventory of trench content exists. The trench caps are three feet thick. The trenches range in length from 35' to 580', with width 8' to 70' and depth 18' to 26'. The last burial occurred April 1978. The bottom of all trenches was supposed to be 7' to 10' above the water table, but trench 18 does intercept the water table.

In 1976, when space in the present 20 care site was exhausted, NECO applied for a 168 acre expansion of the site, but the application was withdrawn at the recommendation of the State Attorney General. In 1979, NECO attempted to abandon Sheffield and the site was officially closed. The Nuclear Regulatory Commission obtained a court injunction, forcing NECO to remain on the site. The perpetual maintenance fund for the site is exhausted, and the State Attorney General has a $99 million suit pending against the operator.

Site Condition

The glacial deposits underlying the site have low permeability, but a continuous pebbly sand unit of high permeability underlies 60% of the site and is the principal pathway for groundwater flow off the site near the east boundary (Johnson, 1983). The sand unit was previously thought to be discontinuous, but the early geological characterizations of the site were quite superficial (ISGS, 1982). Tritium was first detected in a well Spring 1978, and is the only radionuclide detected in monitoring wells above background concentrations (Healey, 1983). In the three year period between 1975 and 1978, tritium had moved 75 feet east, but the migration rate has since accelerated. On October 12, 1982, tritium had migrated 665' from the closest burial trench and was discharging into a pond on private property. In January 1983, NECO purchased 120 acres, including the pond, as a buffer zone. According to NECO consultants, plume velocities ranged between 0.4 and 2.7 feet per day (LAW, 1983). The radiation levels in the plume ranged up to 80,000 pCi/L. The tritium concentrations near the site vary between 200 pCi/L to 2 million pCi/L (2/3 of off-site MPC). Recent chaser dye tests by the Illinois State Geological Survey indicate a narrow tritium plume, now thought to be an underground stream, moving East at a rate of 2000' to 3000' per year (Chinn, 1984). In light of this recent information, the State is reassessing its position on the purchase of additional buffer acreage, and is, instead, investigating the possibility that DOE take over the site. Local citizens have requested that the radioactive waste materials be exhumed and placed in above-ground storage.

The trench caps have severely eroded and cracked, and require continual maintenance. Erosion occurs between the trenches, and cracking occurs at the side of the trench caps. Numerous incidents of subsidence, generally following heavy moisture, have also occurred. Seventy-four separate incidents took place between the months November 1978 and May 1979 (NRC, 1981). Most are small depressions on the order of three feet in diameter, but some are as large as 15' in diameter and 10' deep. Periods of prolonged dryness lead to trench cap cracking, and later erosion and water entering the trenches.

The unsaturated zone averages 12 m in thickness (Healey, 1983), but the cap is saturated late fall and spring. Infiltration of water into the trenches occurs most rapidly in the swale between the caps where the soil is not compacted. Eighty percent of the subsidences occur along the periphery of the trenches. Because the trenches will continue to settle differentially, compaction methods have been proposed consisting of dynamic consolidation (dropping weights 5 to 40 tons from heights 20 to 100 feet), pile drivers (which would go through the waste containers and contaminate the equipment), surcharging (placing heavy loads on the trench caps) and blasting. Grouting the trench contents has also been proposed (NRC, 1981). The costs vary from $49,000 per trench (surcharging) to $854,000 per trench (grouting). It is not clear who would pay for these remedial measures.

WEST VALLEY

Background

The West Valley site is located 30 miles southeast of Buffalo, New York in rural Cattaraugus County. The 3,345 acre site was acquired by the State of New York, June 1961, and leased to Nuclear Fuel Services (NFS) two years later for the construction of a nuclear fuel reprocessing plant (Resnikoff, 1977). The site is located on a plateau bounded on three sides by bedrock hills. Buttermilk Creek cuts through the center of the site about 200 feet below the plateau. The soil in the burial area consists of highly impermeable silty till, with up to ten feet of more permeable glacial till overburden. The silty till contains numerous vertical fractures and layers of more permeable sandy strata. The average annual precipitation is 41".

Construction of the reprocessing plant began in 1963, and the plant started up April 1966. During the six years operating life of the NFS plant, 624 tons of irradiated fuel were processed. The high level wastes were placed in two underground tanks, and liquid and gaseous radioactive effluents were released to the Cattaraugus Creek watershed and atmosphere. NFS operated a 7 acre burial area, licensed by the Nuclear Regulatory Commission, for "solid" radioactive wastes from plant operations: highly contaminated fuel hardware, obsolete equipment, and degraded process solvents "absorbed on a suitable solid medium," (DOE, 1978) or kitty litter. Approximately 528,000 Ci of extremely radioactive materials (volume, 139,000 cubic feet) were buried in 3' x 7' unlined holes, 50 feet deep (Battelle, 1979). One-half ton of irradiated fuel elements were also buried in the NRC-licensed burial ground.

In 1963, the same year the Maxey Flats, Kentucky landfill went into operation, the New York Department of Health granted NFS a waiver of its prohibition against land burial to operate a commercial radioactive landfill. This was the New York State "license". The 25 acre burial plot, part of which is located in former Spitler's Swamp, is adjacent to the NRC-licensed burial area. Both burial areas have the same topographical, surficial and hydrological features. Approximately 740,000 Ci of radioactivity in a volume of 2.3 million cubic feet were buried in unlined trenches in seven acres of the commercial landfill (Battelle, 1979). The commercial landfill ceased operation in 1975 when radioactive trench water began to seep through the trench caps.

Site Condition

As can be seen in Fig. 3, the commercial radioactive landfill has two sets of trenches, northern and southern. The northern trenches, #1 through #7, were cut and filled in the years 1963 to 1969, and southern trenches, #8 through #14, between 1969 and 1975. Within a few years of filling, water began infiltrating and accumulating in the northern trenches. The cause of this water infiltration was comparable to the Maxey Flats case, the walls and bottom of the trench were more impermeable than the cap. The water rise for the northern trenches is shown in Fig. 4. Looking at trench #5, we see that the water rose at a rate of 1'3" per year in the period 1969 through 1971. In the period 1971 through 1973, water levels rose at a rate of 3'3" per year; in the period 1973 through 1975, until the trench caps broke through, the water levels rose at a rate of 5' per year. Each foot rise in the water level is approximately equal to 100,000 gallons of water. The radiation levels in this trench water ranged up to 1000 times off-site MPC. The trench cap breakthrough in trenches #4 and #5 actually exposed the waste materials. The covers were then repaired, and, in 1978, an additional four foot cover was added, contoured and seeded. The water infiltration rates then dropped to 1 to 1.5 feet per year, the same rates as during the period 1969 through 1971. But water infiltration has not ceased, leading us to conclude that infiltration may also be due to underground migration along sandy strata.

Based on the supposedly more successful experience with the southern trenches, covered with an eight foot cap, federal agencies, in 1978, were quite optimistic about the future performance of the northern trenches. "It is too soon to determine the effectiveness of these procedures, but experience with the southern trenches would indicate that infiltration through the caps should now cease and erosion should be prevented (DOE, 1978)." The performance of the southern trenches, which began accepting waste in 1969, was initally better. Just looking at trench #13, one of the last trenches constructed, the water levels remained constant for the years 1973 through 1977. Then in the period 1977 through 1979, at the same time DOE was extolling the virtues of the 8' covered southern trenches, the water levels began to rise at a rate of 2'2" per year (Cashman,1982). Because the Summer of 1979 was dry, the clay trench covers may have cracked more than usual, thereby providing a water infiltration route the following Winter and Spring. The infiltration rate increased in 1980 and the State began pumping the "improved" southern trenches to avoid trench cap breakthrough. The pumping operation, a process we call "controlled leakage," involves transferring the radioactively-contaminated water to a treatment facility, where the water is passed through ion-exchange resins and then released to the Cattaraugus Creek watershed. Obviously this treatment method releases tritium quantitatively. The radioactive sludges are then buried in the NRC-licensed burial area. Similar to Maxey Flats, the West Valley trenches contain high levels of the chelating agents EDTA and DPTA (NRC, 1984a). We expect the presence of these chelating agents to lead to the complexing of cobalt, plutonium, americium and strontium, and to their migration. The treatment facility has questionable effectiveness in the presence of these chemicals.

Another serious concern at both burial areas is rapid erosion of the plateau banks towards the burial ground area (NRC, 1984b). In 1978, the steeper trench slopes were covered with a plastic sheet and a layer of crushed stone "to anchor and protect it from sunlight (NRC, 1980)." This is clearly only a temporary solution. To attempt to eliminate continual maintenance at the West Valley site, the State of New York through the New York State Energy Research and Development Authority, contracted with DOE to study how to decommission the burial areas.

While much attention was focussed on the State-licensed commercial burial ground, little notice was paid to the NRC-licensed burial area. Because of high tritium levels in the ravine between the State-licensed and NRC-licensed burial areas, an official of the New York Department of Health, in rare agreement with citizen groups, called for the exhumation of the NRC-licensed burial area (NYSDOH, 1979). Still, any potential problems with the NRC-licensed burial area would have gone unnoticed had the New York State Geological Survey not struck oil on the North slopes, or more properly, struck kerosene contaminated with plutonium. This plutonium-contaminated kerosene was detected 20' below ground, approximately 60 feet from the nearest potential source. The radioactive concentrations are on the order of 1,000 times the off-site maximum permissible concentrations, due primarily to iodine-129 with a half-life of 17 million years. Since the federal agencies and New York State Geological Survey had assured everyone that the silty till was impermeable, this plutonium migration came as yet another surprise.

Tributyl-n-phosphate (TBP) is a chelating agent used in the processing of nuclear fuel. After irradiated fuel is dissolved in nitric acid, this organic is added and selectively removes uranium, plutonium and some fission products. Eventually this solvent becomes too contaminated and must be disposed of. At West Valley, this solvent was buried in 1000 gallon tanks in the NRC-licensed burial area; in the case of Windscale, it was disposed of in the Irish Sea. In this experiment taking place in the field, it is now believed that kerosene with TBP increases the permeability of silty till. A radiation plume, extending over 30 feet in width, with uncertain depth, is now moving towards a feeder stream of Buttermilk Creek, Erdman's Brook, to the north of the NRC-licensed burial area (see Fig. 4). A string of interceptor wells has been placed at the edge of the plateau, near Erdman's Brook. The NRC is funding a major research and development program, detailed in (ORNL, 1984), to determine how to stem the tide. At present, wells have been drilled near the likely leaking tanks and radioactive solvent is being removed as it accumulates. Complicating this problem is the fact that kerosene floats on water, thereby rising and falling depending on the seasonal fluctuations. Fortunately, burial holes SH-10 and SH-11, the likely kerosene sources, contain very little radioactivity, less than one Curie total. However, carbon steel tanks in holes SH-27, SH-28 and SH-29, contain about 1,100 Ci in organic solvent. Since these carbon steel tanks will surely degrade, if they have not done so already, we have again called for exhumation of these tanks before plutonium begins to migrate.

BARNWELL

Background

The 280 acre Barnwell, South Carolina landfill is a major operating landfill for radioactive waste in the United States. In 1982, approximately 35,000 cubic meters, or 46% of the radioactive waste volume, and about 2/3 of the radioactivity, were buried at Barnwell (EGG, 1983a). In 1979, the Barnwell site accepted 2/3 of the nation's waste volume (NUS, 1980) until the Governor of South Carolina imposed a montly capacity limit of 100,000 cubic feet. Much of the excess now goes to the Richland, Washington, landfill. The Barnwell site is owned by the State of South Carolina, who has licensed Chem-Nuclear Systems, a subsidiary of Waste Management, Inc., to operate the site until 1992. The State has made clear its preference to close the site at that time when supposedly another state in the Southeast will open a facility.

The Barnwell site is located about 70 miles southwest of Columbia near the Savannah River. Originally licensed in 1972, the site has a large capacity, 2.4 million cubic meters. Unlike the Maxey Flats and West Valley sites, the surficial materials are permeable sand and clay. Water entering the trench caps does not accumulate, but passes directly out the bottom of the trench. No trench water samples have yet been collected even though the mean annual precipitation is over 43" per year. Thus, unlike the Maxey Flats and West Valley landfills, radioactive materials do not "brew" in trench water at Barnwell. Surface water runoff is also minimal because of the sandy soil and flat topography. Compared to the northern sites, little radioactivity has migrated out of the Barnwell landfill.

Site Conditions

Radioactive waste is buried with the standard cut and fill burial method used at other sites. In the early 1970's, waste was buried quite haphazardly. Barrels were often rolled out of the rear of semi-trailers, in what we call the "kick and roll method." See Figure 5. At the present time, all waste materials must be solid, and are packed tightly within the trench in order to minimize void spaces. The problems of package degradation, trench cover subsidence and water infiltration, are no different at Barnwell than at the three closed sites in the north, but little radioactivity has migrated because of the more permeable nature of the surrounding medium.

Some migration of tritium has taken place at Barnwell. In 1981, tritium was detected at the 21 meter depth, at levels of 116,000 pCi/L (Cahill, 1982), indicating downward movement of water from the trenches. Tritium has also been detected above background levels as far as 75 meters southwest of buried waste (Cahill, 1982). The only other radionuclide to have migrated was cobalt-60, found in core samples beneath Trench 2. The activity levels were 690 pCi per gram of sediment, and decreased to non-detectable levels at depths 1.8 meters below the trench floor. Since the same chelating agent that migrated at the NRC-licensed burial ground at West Valley, tributyl-n-phosphate, was buried at Barnwell until 1982, we suspect that cobalt-60 and strontium-90 will begin to migrate as the waste packages degrade.

RICHLAND/BEATTY

The Richland, Washington, and Beatty, Nevada, sites are located in semi-arid and arid parts of the United States, respectively. The absence of precipitation greatly simplifies waste management procedures. The trenches remain open until completely full. Unlike the East, no attention is paid to eliminating void spaces, and the trench caps are not compacted. No sampling of trench water need be carried out. The one serious disadvantage of these sites is that they are located far from major waste generators in the East thereby greatly increasing transportation costs and impacts. Slight problems at these Western sites, scarcely meriting attention, are wind erosion and animal movement (gophers burrowing into trenches, for example).

The 80 acre Beatty Site is located near Death Valley, 105 miles northwest of Las Vegas. The annual precipitation is only 4". The soil is sand and gravel. The only problems have involved radioactive drums that were buried outside of the site boundary, and radioactive materials that were removed from the site (and later returned). In 1982, Beatty accepted 2% by volume of the nation's waste (EGG, 1983a).

The 100 acre Richland site is located near the Oregon border, at the confluence of the Yakima and Columbia Rivers. The annual precipitation is 6". The soil is also sand and gravel. In 1982, Richland accepted 52% of the nation's waste, becoming the major landfill for the United States.

If the NRC allows present decontamination practices to continue, it is likely that these two dry sites will receive large volumes of wastes from decommissioned reactors. These wastes contain chelating agents that react poorly when mixed with wastes from medical and research institutions that contain toluene and xylene (NRC, 1983a). Solidified decommissioning wastes with tain toluene and xylene (NRC, 1983a). Solidified decommissioning wastes with chelating agents showed up to a 35% weight loss when immersed in representative trench liquids (NRC, 1983a). Because of this, the NRC has placed a condition on the Dresden I reactor license requiring the disposal of these wastes in a dry environment. Unless the NRC forces a change in the waste management practices at reactors, by the end of the 1990's, a large amount of waste from decommissioned reactors will go to the West. By directing wastes from one region to another, the NRC is over-riding the Low Level Radioactive Waste Act of 1980, which requires each region of the country to handle its own waste.

IMPLICATIONS/FUTURE TRENDS

What Has Been Learned?

What has been learned by the public and State and federal regulators from past experience at radioactive landfills? How will this affect future siting, design, operation, and closure of waste facilities? Let me first discuss the "lessons learned" from the public perspective, and then briefly describe the new NRC regulations, 10 CFR Part 61, which will be discussed in much more detail as the next topic on the day's agenda. Much of what the NRC has learned is embodied in their new regulations.

Clearly radioactive landfills in the Northern humid regions have operated poorly, and those in the arid regions have operated satisfactorily. Even in the Northern humid regions, the off-site radioactivity concentrations in water and the dose to an individual have been low. While trench water itself has been on the order of 1000 times maximum permissible concentrations, dilution has greatly reduced the concentrations while generally increasing the number of persons contacted. From our perspective, calculations have not fully taken account of the full dose to present and future populations, but this is a topic for another day. All would agree it must be the aim of regulatory agencies to minimize radiation exposures and greatly improve past performance. Rather than stabilized, maintenance-free landfills, we have sites that have required active maintenance within ten years of trench closure.

The problems at the three landfills in the humid North have been due to the following factors:

1) superficial geologic site characterizations and excessive groundwater. This has partly arisen from the lack of siting criteria, and license and information requirements at the time. Contrary to the NRC view that "final siting decisions have been based largely on hydrogeologic and economic factors (NRC, 1980)," in fact, according to the Illinois Geological Survey, "the geologic descriptions were fairly superficial (ISGS, 1982)." Yes, hydrogeology was a factor if it was the intent to site one landfill in a swamp (West Valley) and another in an underground stream bed (Sheffield).

2) degradation of waste containers and the waste form itself, in a short time period,

3) subsidence, cracking and erosion of trench caps, which has led to water infiltration into trenches, the "bathtub effect",

4) presence of chelating agents, which has made soluble normally insoluble

americium, cesium, strontium, plutonium and cobalt, and

5) lack of stabilization and long-term care funds, which has passed the financial burden from the waste generators and disposal companies to the state and federal taxpayer.

In the humid North, the public perception of both radioactive and toxic chemical landfills is that they don't work. Landfills are like tea bags -- the water comes in, the flavor goes out. It is clear that there will be intense public opposition wherever a future radioactive landfill is proposed. It would be best to proceed as if landfills were not an option. Clearly some uses of radioactive materials are absolutely essential to a modern society, until safer substitutes are devised. To care for this mimimum amount of radioactive materials, we would separate long and short lived materials at the source, where feasible. The short-lived materials should be allowed to decay to non-hazardous levels on-site, if feasible. Voluminous materials could be super-compacted, and stored in above-ground storage facilities with leachate collection systems, as is done in many parts of the world. For all the problems in preventing trench cap subsidence, cracking and erosion, just ten years after trench closure, it would have been vastly simpler and cheaper to repair the roof of a storage building. The longer-lived and more hazardous "low-level" waste should be reclassified as high level waste and be disposed of deep underground. On a more general note, as a matter of equity, we would not transfer the waste burden geographically or over time. Those who use radioactive materials which produce waste should pay the cost. In general, as a society, we should only generate those necessary hazardous materials we can safely manage. These are some of the "lessons learned" by the public.

NRC Siting Regulations -- Too Little, Too Late

The new NRC siting regulations for radioactive landfills, 10 CFR Part 61, are an important attempt by the agency to correct past problems and a significant improvement over past regulations. We support the overall siting objectives: to identify sites that can be easily characterized and modelled, have sufficient depth to the water table, and are well-drained and not erosion-prone. To avoid cap subsidence, the regulations require structural stability for the waste containers or waste forms, and minimization of void spaces. The regulations require a buffer zone. Taken all together, the objective of the regulations is to keep water away from the waste, and to lengthen the travel time to the site boundary so that the dose to the public is greatly reduced. Had these regulations been in force 20 years ago, the present problems might have been avoided. But they weren't and now the public and state officials are asking for more protection in the form of engineered alternatives to radioactive landfills. Responding to public pressure, State officials are asking the NRC to rapidly develop regulations to site engineered storage facilities (NRC, 1984b) just when the NRC had geared up to site landfills.

I say the present problems "might" have been avoided because the NRC regulations still leave much to be desired -- almost all the specific numbers are removed. The overall objectives are admirable, but it is essentially left for the licensing process to determine whether the overall objectives will be satisfied by a particular site. Without specific numbers in the regulations, the process will inevitably focus on the credibility and opinion of expert witnesses. It therefore leaves a sliding scale, and an alien forum for the public, who is really left to battle out these scientific questions in the political arena.

For example, there is no numerical limit for deformation of waste, no compressive load requirements, no lower limit for soil hydraulic conductivity, no time limit on stability requirements for containers or waste forms, and no third party liability requirements. Many requirements have the appended phrase, "to the extent practicable". Caps must minimize water infiltration "to the extent practicable." The site must minimize standing water "to the extent practicable." And so on. What numbers are given are either too high or too low. After the site is closed, the time period when the State must monitor and maintain the radioactive landfill, is 100 years. This time period is either too low, or some long-lived materials, with hazardous lives on the order of hundreds to tens of thousands of years, must be excluded. The maximum off-site dose is 25 millirems, which is much too high for a 100 year or 1000 year radiation source. In short, we find the new NRC regulations too little, too late.

Waste from Retired Reactors -- A Sleeping Giant

No large commercial power reactors have yet been decommissioned, nor dismantled, in the United States, though four have been shut down permanently (Dresden I, Humboldt Bay, Indian Point 1, and Three Mile Island 2) Since a large number of reactors went into operation in the early 1970's, we expect major decommissioning work will begin around the year 2000. The process of retiring reactors will produce a large volume and radioactiveinventory of "low-level" waste. The NRC estimates that four years of decommissioning will produce a volume of waste comparable to that produced during 30 years operation of the reactor (NRC, 1983b). The radioactivity from decommissioning will be an order of magnitude greater than from "low-level" waste during 30 years of reactor operation, and will be comprised of radionuclides with long half-lives, up to 20,000 and 80,000 years, respectively, for niobium-94 and nickel-59.

Power reactors will not necessarily be dismantled around the year 2000. This will probably take place 30 years after shutdown. Most probably utilities will decontaminate and discard radioactive piping, leaving the smallest volume of radioactivity to monitor and safeguard for perhaps an additional 30 years when dismantling will occur. To do this decontamination, utilities are already using chelating agents which complex with metals such as cobalt and plutonium. Unfortunately, these chelating agents will mobilize formerly insoluble radionuclides in landfill trenches, and have already done so at Maxey Flats. Sufficient quantities of chelating agents are already in the West Valley trenches to do the same (NRC, 1984a). Levels as low as 2 ppb can complex cobalt (Dayal, 1983). Recognizing this problem, the NRC requires utilities to dispose of solidified decontamination chemicals in arid landfills -- Beatty or Richland. If this practice continues, these landfills will be accepting large quantities of decommissioning wastes by the year 2000. Really, the NRC should put a halt to the use of chelating agents, and force the industry to use abrasives, as an alternative.

This whole issue will be up for discussion this coming session of Congress when amendments to the Low Level Radioactive Waste Act of 1980 are considered. The ACT allows regions to ban out-of-region waste, but the NRC wants the authority to over-ride these regional export/import restrictions. Once this Pandora's Box, the LLRWA is opened, a range of issues will beon the table. Chief among these for environmental groups is the definition of "low-level" waste.

The Case of the Vanishing Radionuclides

Well, everyune, particularly the British, like a good mystery story. This is the case of the vanishing radionuclides. Despite the fact that more reactors are on-line and medical use of radionuclides has greatly increased, the amount of waste snipped to radioactive landfills has declined between 1979 and 1982, both in terms of volume (5% drop) and radioactivity (13% drop) (EGG, 1983a). Is it the case of the Midnight Dumper? Well, yes, in a way. With the closure of three landfills in the mid to late 1970's, and a capacity limit at the Barnwell site, landfill space has become scarce. Responding to pressure by waste generators, the NRC has lifted the "below regulatory standards" level, allowing higher concentrations of tritium and carbon-14 to be poured down the drain. Further, the NRC has established no regulations against dilution of radioactivity, so it is possible to dilute waste to "below regulatory standards." As an another example, the NRC recently permitted Duke Power to plow water cleansing sludges from the McGuire reactors into open land, about an acre a year. Medical and research waste generators are also pressuring regulators to allow incineration within cities. Since carbon-14 and tritium are the main radionuclide constituents of medical and research waste, forming CO_2 and water vapor, incineration is really a form of dispersion or dilution of radionuclides. In Pennsylvania (Babcock & Wilcox) and North Carolina (U.S. Ecology), applications are being processed for large central incinerators.

Since new landfills in rural areas, and incineration within cities, are being vigorously resisted, waste generators in cities, basically hospitals and research institutions, are being squeezed. This is a small amount of radioactivity, in the scheme of things, less than 1%. Utilities have the ability to weather the radioactive waste storm since they have the capacity to store radioactive waste on-site for the full operating lives of their reactors, if it comes to that. But there is little storage room in New York City, for example; try to get an apartment there! Unfortunately, above-ground storage, the most publicly acceptable method, will cost waste generators more than landfills, unless one internalizes the real long-term care and maintenance costs. It therefore will be opposed by all waste generators. This push and pull, from the cities to the country, and from the local level to Washington, is what can be expected in 1985. It is not a battle for the timid.

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Table 1. Production of Radioactive Waste by Waste Generator Category (in percent)

Category	Volume	Curie
Nuclear Power Reactors	54	24
Industrial	11	73
Institutional	33	0.4
Government	2	2.6

Data from (DOE, 1983).

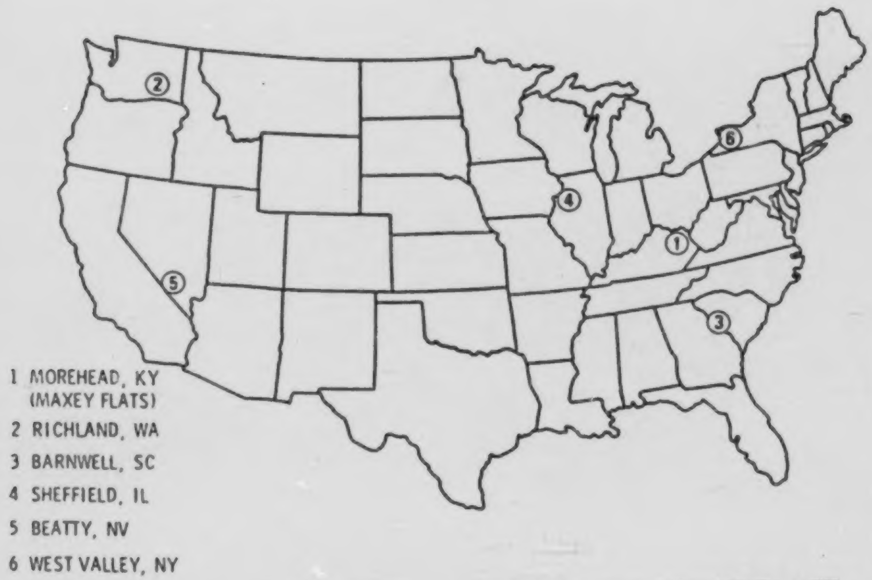

②
⑥
④
①
⑤
③
1 MOREHEAD, KY (MAXEY FLATS)
2 RICHLAND, WA
3 BARNWELL, SC
4 SHEFFIELD, IL
5 BEATTY, NV
6 WEST VALLEY, NY

Figure 1. Location of commercial radioactive landfills in the United States. Because of water infiltration and radioactive migration problems, the landfills at Sheffield, Illinois; West Valley, New York; and Maxey Flats, Kentucky are now closed. Figure from (NRC, 1980).

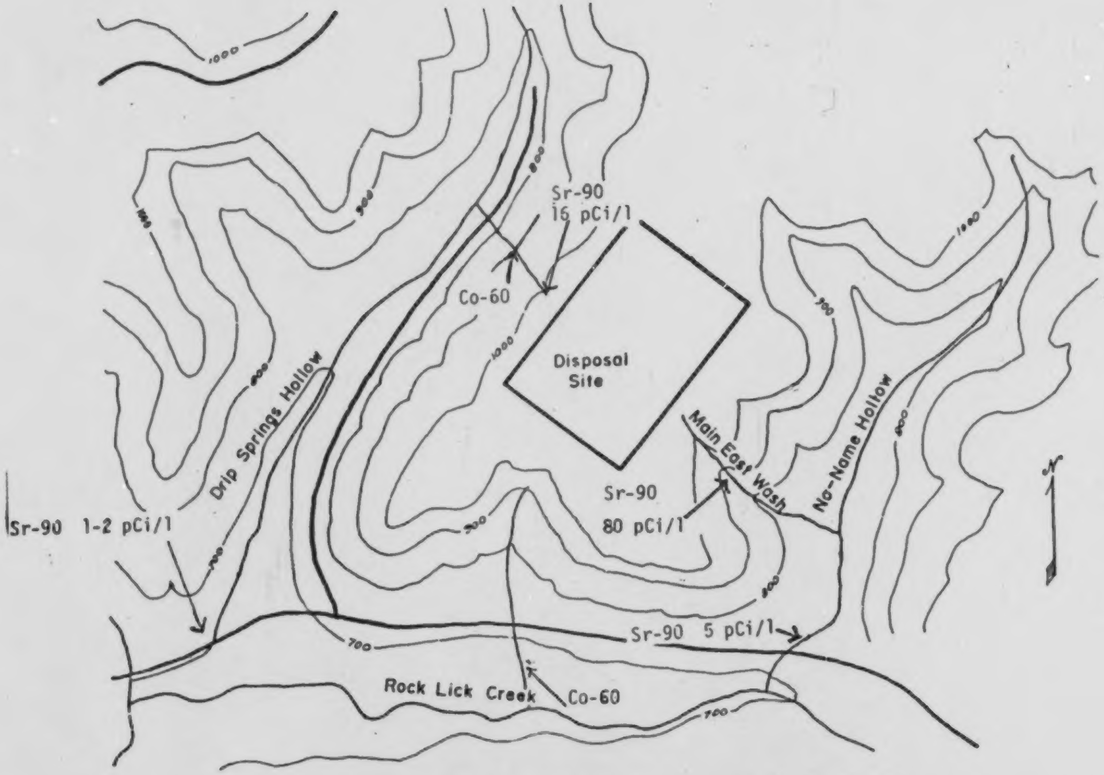

1000
900
800
700
1000
Sr-90
16 pCi/1
Co-60
Disposal
Site
Drip Springs Hollow
Main East Wash
No-Name Hollow
Sr-90
80 pCi/1
Sr-90 1-2 pCi/1
Sr-90 5 pCi/1
Rock Lick Creek
Co-60
N

Figure 2. Radiological measurement at the Maxey Flats, Ky., radioactive landfill 1974-1975. Figure from (EPA, 1977).

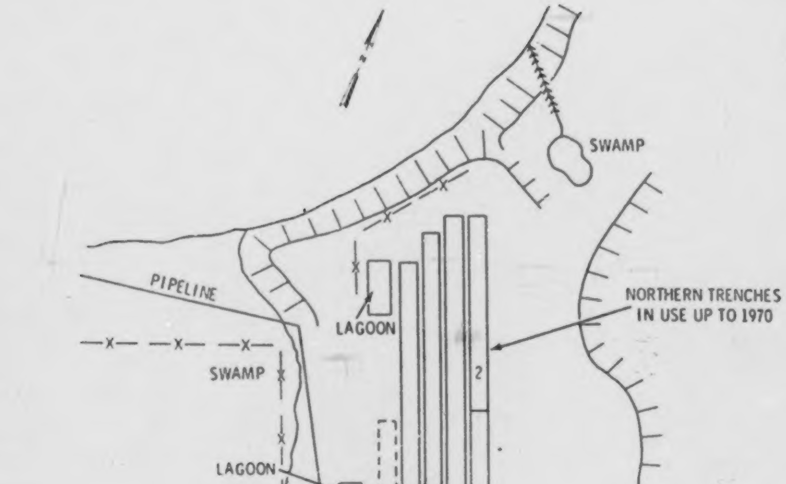

SWAMP
PIPELINE
LAGOON
NORTHERN TRENCHES IN USE UP TO 1970
SWAMP
LAGOON
2
6
5
4
3
1
7
SECURITY FENCE
14
13
12
11
10
9
8
SOUTHERN TRENCHES IN USE UP TO 1975
0
50
100 METERS

Figure 3. Trench layout at the closed State-licensed radioactive landfill at West Valley, New York. Radioactive water overflowed the northern trenches #4 and #5 in 1975. The NRC-licensed burial area, where plutonium-contaminated kerosene is migrating north of the barbed wire fence, is immediately adjacent to the State-licensed area and in the upper left corner of the figure. Figure modified from (DOE, 1978).

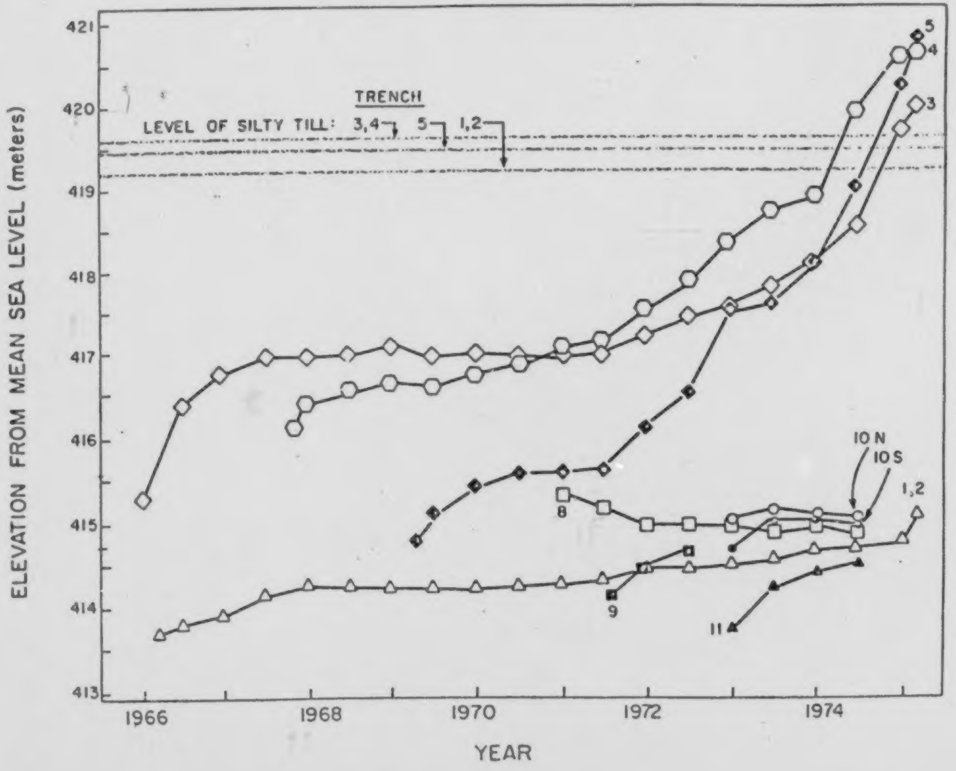


Figure 4. Rise in water level in trenches of State-licensed radioactive landfill at West Valley, New York. In 1975, radioactively-contaminated water overflowed trenches 4 and 5, breaking through the trench caps and exposing the buried waste. Figure from (Cashman, 1982).

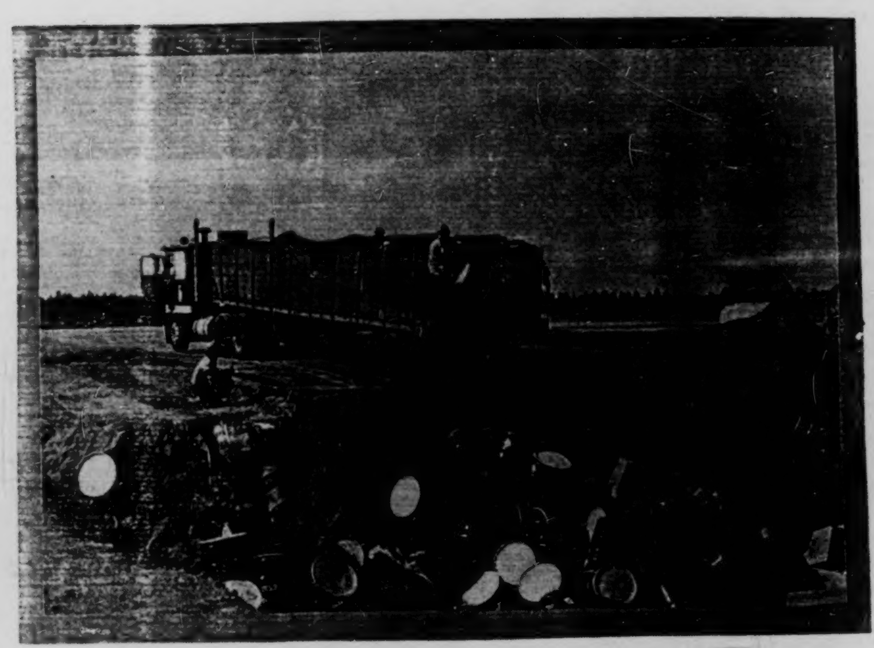


Figure 5. 'Kick and roll' disposal method formerly used at the commercial radioactive landfill at Barnwell, S.C. The random placement of drums leads to void spaces and cap subsidence. (Photo courtesy of Chem-Nuclear, Inc.)

SIERRA CLUB

radioactive waste campaign fact sheet

Radioactive Waste: Buried Forever?

A Profile of Commercial Radioactive Landfills

Common language breaks down when it comes to radioactive waste. Take the term "land disposal of 'low-level' radioactive waste;" the phrase implies the final, safe resolution of a minor problem. After all, "low-level" should mean the waste is not dangerous. In fact, "low-level" waste can range from slightly contaminated clothing and test tubes to highly radioactive sludges from nuclear reactors. "Low-level" is practically everything that is not the irradiated nuclear fuel itself.

According to Webster's dictionary, "dispose of" means to "get rid of." The waste should be gone. In fact, "land disposal" means nothing more than dumping radioactive waste into an unlined trench and covering it with an earthen cap, a technology no more sophisticated than a garbage landfill.

Radioactive landfills have had a bad history of leaking. As the thousands of steel drums and wooden crates that contain lethal wastes rust and decay, the earthen covers slump and crack, allowing rainwater to seep into the trenches. Radioactivity mixes with water and then leaks out. In humid regions of the country, three out of four commercial radioactive landfills have closed due to leakage problems. The fourth, at Barnwell, South Carolina, has had a mixed record to date. On the other hand, two landfills in semi-arid areas--Beatty, Nevada and Richland, Washington--have operated with few problems. In Figure 1, the location of these six sites are shown.

New regulations issued by the Nuclear Regulatory Commission (NRC) are intended to minimize radioactive leakage. Unfortunately, in regions with plentiful groundwater, these improved regulations will not stop natural physical processes, such as water migration and the settling and fissuring of trench covers, from occurring. In addition, the new NRC regulations will not guarantee that sufficient funds are set aside to care for these long-lived wastes, or that the waste facility will outlive the radioactive wastes contained in it.

What Is "Low-Level" Radioactive Waste?

"Low-level" radioactive waste is defined by the NRC as everything that is not uranium mill tailings or high-level waste (i.e. irradiated nuclear fuel). This covers a broad range of hazardous levels, from mildly contaminated gloves and test tubes to extremely radioactive industrial and utility waste such as contaminated filters and piping. All are dumped into radioactive landfills, the predominant disposal method for "low-level" radioactive waste. Table I outlines the sources of "low-level" radioactive waste produced in the U.S.

Note that although institutional waste accounts for 33% of the volume of radioactive waste, it contributes less than 1% of the total radioactivity.[1] In contrast, industry produces very little waste volume, but that waste accounts for 73% of the total radioactivity. Yet all this barely radioactive material from medical and research institutions is dumped into the same landfill as industrial waste, which is much more radioactive.

The predominant radionuclides in reactor "low-level" waste are cobalt-60 and cesium-137, with half-lives of 5 and 30 years respectively. Using ten half-lives as a rule of thumb time period for radioactive materials to decay to non-hazardous levels, reactor waste comprises a 300-year landfill problem. In the process of decontaminating and dismantling a nuclear reactor, "low-level" wastes containing radionuclides with half-lives on the order of tens of thousands of years are generated. Furthermore, decontamination chemicals called chelating agents--used to clean out reactor pipes by dissolving insoluble radionuclides--are also buried in landfills. This practice has seriously compounded migration problems at radioactive landfills in Maxey Flats, Kentucky and West Valley, New York, since chelating agents speed-up the migration process.

TABLE 1. PRODUCTION OF RADIOACTIVE WASTE BY WASTE GENERATOR CATEGORY (by percent)

Category	Volume	Curie
Nuclear Power Reactors	54	24
Industrial	11	73
Institutional (medical & research institution)	33	0.4
Government	2	2.6

Data from (DOE, 1983)

MAXEY FLATS, KENTUCKY

Maxey Flats, located in northeastern Kentucky about 65 miles east of Lexington, operated from 1963 to 1977. The site is cut by tributaries of the Licking River which feeds into the Ohio River.

Because of abundant rainfall, water has entered the trenches through the more permeable trench caps which covered the buried radioactive materials. Even after 20 years, trench contents continue to settle, causing cracks in the caps that allow water into the trenches. Because of the low permeability of the clay/shale sides and bottom of the trenches, water accumulated and eventually filled the trenches. After mixing with the buried materials, the water became radioactively contaminated and eventually overran the top of the trench or seeped through shale fractures into surface ground water.

By 1972, over one million gallons of water had accumulated in the trenches and emergency remedial action was instituted. Trench water was pumped into tanks, evaporated, and the resulting sludges were stored in a tank on-site. In subsequent years, up to two million gallons of contaminated water per year were pumped from the trenches. Finally, in 1981, the State covered three-quarters of the site with a temporary plastic sheet that reduced, but did not eliminate, the water infiltration to the trenches.

While the company that operated the site, NECO (now called US Ecology), claimed that below-surface migration of plutonium was impossible, the Environmental Protection Agency (EPA) found plutonium in surface soil, monitoring wells and drainage streams. According to the EPA, "The burial site was expected to retain the buried plutonium for its hazardous lifetime, but the plutonium has migrated from the site in less than ten years. If 100% retention of waste...is the goal of shallow-land disposal, continued burial of plutonium in humid climates using present waste forms, containers and trench construction methods will not achieve the goal" (Meyer, 1975).

Tritium has been detected in domestic well water, milk samples from cows near the Maxey Flats site, and in drinking water from Rock Lick Creek. In 1977, when radioactivity was found in a newly dug trench which had not yet received any radioactive waste, the site was closed and the State of Kentucky took over as manager.

The State estimates costs for remedial action to reduce problems at the site, excluding project management costs and contingencies, will range from $52 million to $121 million. The higher estimate is equivalent to $60 per cubic foot of waste material buried at Maxey Flats. It is interesting to compare this real cost to the ideal costs to maintain and monitor a site, quoted by a Department of Energy (DOE) contractor, EG&G, of $2 per cubic foot in 1983. Obviously, clean-up costs must be incorporated into the full "disposal" costs before landfills are held up as a "cost effective" method of handling radioactive waste.

SHEFFIELD, ILLINOIS

This landfill, operated by US Ecology, is located in Bureau County, about 50 miles north of Peoria. The 20-acre site, which operated from 1967 to 1978, is located in a region of abandoned coal mines, bordered to the north by rolling terrain and a US Ecology hazardous waste disposal site.

In 1976, space in the Sheffield site was exhausted and, at the recommendation of the State Attorney General, the US Ecology application for expansion was withdrawn. In 1979 US Ecology, the same site operator as at Maxey Flats, attempted to abandon the site and was forced by a court injunction to remain. The perpetual maintenance fund, generated by disposal fees to provide long-term care of the site, is exhausted. The State Attorney General has a $99 million court suit pending against US Ecology.

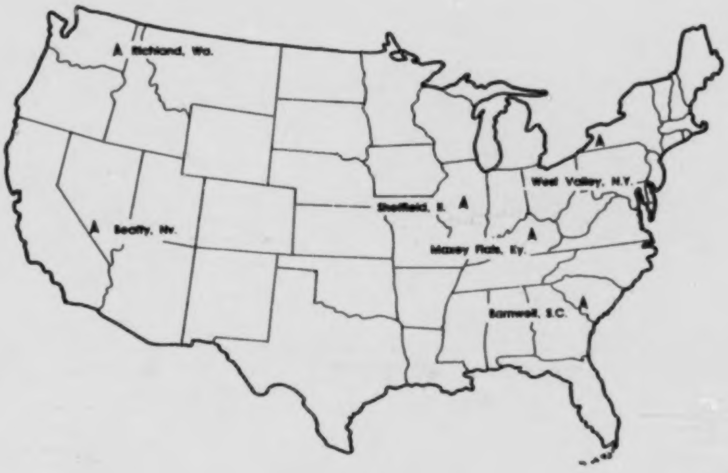
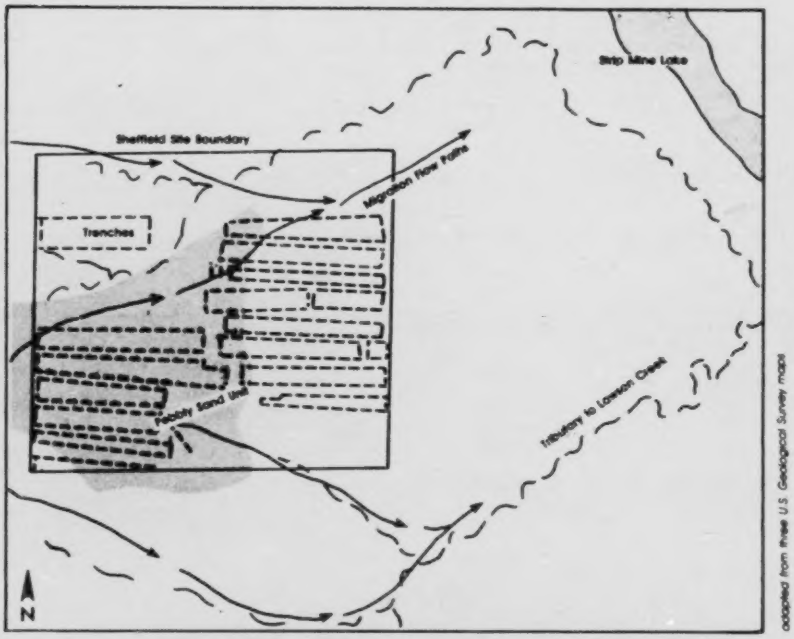


Figure 1. Location of the six commercial radioactive landfills in the U.S.



adapted from three U.S. Geological Survey maps

Figure 2. Map shows tritium leakage at the Sheffield landfill. A pebbly sand unit underlies ⅔ of the Sheffield site. Tritium migrates out the east side of the site to Strip Mine Lake, 800 feet from the site boundary. The plume is 30 to 50 feet wide, and is moving about 2,500 feet per year.

Again, water entered the trenches through eroded trench caps, became contaminated and leaked out. Cap depressions, due to the trench contents settling, are as large as 15 feet in diameter and 10 feet deep. Radioactivity is released through an underground pathway, a continuous pebbly sand strata of high permeability that underlies two-thirds of the site. Recent tests by the U.S. Geological Survey indicate that a narrow tritium plume, now thought to be an underground stream, is moving east at a rate of 2,000 to 3,000 feet per year. Figure 2 illustrates the leakage problems at Sheffield.

In January 1983, US Ecology purchased 120 acres of land as a buffer zone. This included a pond located on private property into which the aquifer was discharging. But the problem is more serious than a buffer zone can handle. Local citizens have requested that the radioactive materials be exhumed and placed in above-ground storage. This may be the only solution to the problems at Sheffield.

WEST VALLEY, NEW YORK

The West Valley radioactive landfills are located 30 miles southeast of Buffalo, New York, in rural Cattaraugus County. The site is situated on a plateau, bounded on three sides by bedrock hills. Creeks that feed tributaries of Lake Erie cut through the center of the site. Soil in the area is highly impermeable clay, with numerous vertical fractures and occasional layers of permeable sandy strata.

The West Valley site was originally designed to accommodate a reprocessing plant operated by Nuclear Fuel Services (NFS). In 1966, a seven-acre burial area to hold the solid radioactive wastes produced by plant operations was licensed by the NRC. These solid wastes were buried in unlined holes, 50 feet deep.

In 1963, the New York Department of Health granted NFS a waiver of its prohibition against land burial and allowed the company to operate a commercial radioactive landfill. A 25-acre plot was opened, part of which is located in the former Spitler's Swamp, adjacent to the NRC-licensed burial ground. This radioactive landfill ceased operation in 1975 when radioactive trench water broke through the 4-foot thick northern trench caps and spilled into surrounding streams.

In order to correct the problem of water infiltration, an additional 4 feet of clay was added to the northern caps, then mounded, compacted and reseeded. By 1980, erosion and the settling of trench contents had taken their toll, and the State had to begin pumping radioactive water out of both the northern and southern trenches to avoid another trench cap breakthrough. As of 1981, over three million gallons of contaminated water had been pumped, treated and then released to the Cattaraugus Creek watershed. All radioactive tritium was released in the process.

In addition to the commercial landfill, the NRC-licensed site has severe problems. The U.S. Geological Survey, monitoring underground water movement, detected kerosene contaminated with plutonium approximately 60 feet from the nearest potential source in 1983. The radioactive concentrations were on the order of 1,000 times the maximum permissible off-site concentrations allowed by the NRC. In 1985, the Department of Energy recommended that the leaking tanks be exhumed from the burial site.

BARNWELL, SOUTH CAROLINA

The Barnwell, South Carolina landfill is one of two major operating radioactive landfills in the United States. In 1982, it received almost one-half of the radioactive waste volume and two-thirds of the radioactivity in "low-level" waste produced in the United States.

The Barnwell site is located about 70 miles southwest of Columbia near the Savannah River. Unlike the Maxey Flats and West Valley landfills, the soil at this site is permeable sand and clay. Rainwater that enters through the trench caps does not accumulate, but passes directly out the bottom of the trenches. In 1981, tritium was detected 69 feet below the trenches, and has been detected above background levels as far as 245 feet southwest of the burial area.

Of greater concern at the Barnwell landfill is the chelating agent tributyl-n-phosphate (TBP), the same chemical that promoted migration at West Valley. TBP was buried at Barnwell until 1982. This chemical combines with different elements--such as uranium, plutonium, cobalt and strontium--and makes them more soluble.

Another cause for concern at Barnwell is the potential for subsidence of trench caps due to void spaces created by the haphazard disposal of drums. In the early 1970's, barrels were often rolled out the rears of semi-trailers, in what we call the "kick and roll method" of waste disposal shown in Figure 3). At the present time, all waste materials must be packed tightly within trenches to minimize void spaces.

RICHLAND, WASHINGTON
BEATTY, NEVADA

The Richland, Washington and Beatty, Nevada landfills are located in dry regions of the country. The absence of high rainfall somewhat simplifies waste management procedures at these sites. The one serious disadvantage of these sites is that they are located far from major waste generators in the East, which greatly increases transportation costs and potential environmental impacts.

The Beatty site is located near Death Valley, 105 miles northwest of Las Vegas. The soil at this 80-acre site is sand and gravel. Although no significant migration problems have been discovered, there have been several reports of workers taking home contaminated tools and of waste being buried off-site. This led the Governor of Nevada to severely limit the amount of waste accepted at Beatty. In 1982, Beatty accepted 2% by volume of the nation's radioactive waste.

The Richland site is located near the Oregon border, at the meeting of the Yakima and Columbia Rivers. The soil at this 100-acre site is also sand and gravel. In 1982, Richland accepted 52% of the nation's radioactive waste. Although there have been few problems at Richland, it is interesting to note that a military landfill at Hanford, Washington, adjacent to Richland, has shown migration of plutonium beneath a trench; in addition, a tritium plume has extended six miles from the site into the Columbia River.

What Has Been Learned?

Clearly, radioactive landfills in the northern humid regions have operated poorly, while those in arid regions of the country have had less difficulty. While the radioactive concentration in water which has leaked from the trenches has been 1,000 times the maximum permissible concentrations set by the NRC, downstream dilution of the contaminated water has greatly reduced these levels. But this increases the number of persons who ingest this radioactive pollution. Individual doses have so far been low, though calculations do not fully take into account the total dose to present and future populations.

The problems at landfills in humid regions have been due to the following factors:

- o superficial geologic site characterizations
- o excessive groundwater
- o degradation of waste containers and the waste itself
- o slumping, cracking and erosion of trench caps, leading to water seeping into the trenches
- o presence of chelating agents, which have dissolved normally insoluble radionuclides and caused them to migrate out the trenches
- o lack of funds for long-term care of the site. This has passed the financial burden from the waste generators and disposal companies to the state and federal taxpayer

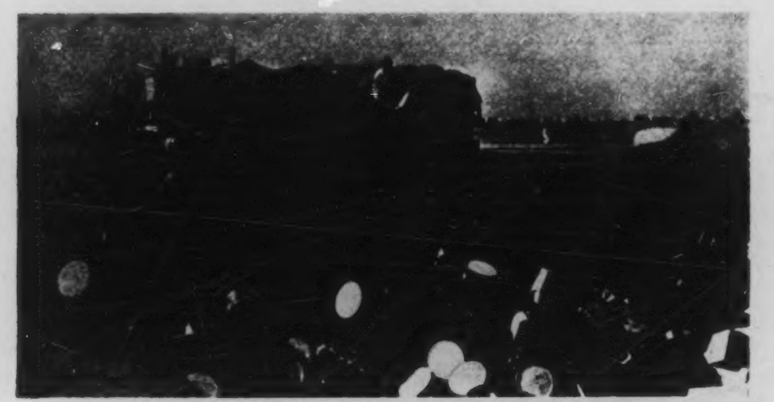


Figure 3. Kick and Roll? This is how Chem-Nuclear used to get rid of nuclear waste shipped from all across the U.S. Now the barrels are neatly stacked in the trenches to decrease the slumpage of the trench covers.

TABLE 2. GENERIC PROBLEMS AT CLOSED RADIOACTIVE LANDFILLS AND WHETHER NEW NRC REGULATIONS 10 CFR PART 61 WILL RESOLVE THEM

GENERIC PROBLEMS AT RADIOACTIVE LANDFILLS	***NRC REGULATIONS 10 CFR PART 61***	***COMMENTS***
superficial geologic site characterization	"disposal site shall be capable of being characterized;" site must minimize standing water, "to the extent practicable;" have sufficient depth to the water table (unless in clay medium); and areas of erosion must be avoided (61.50)	desireable objectives, but no specific criteria; no lower limit for soil hydraulic conductivity
degradation of waste containers and the waste itself	voids must be minimized, waste not packaged in cardboard boxes, no free-standing liquid, and package must have structural stability (61.56)	no time requirements for life of containers; no specific criteria for minimizing void space in trenches; no numerical limits for stability under compressive loads
slumping, cracking and erosion of trench caps, leading to water seeping into trenches	covers designed to minimize water infiltration "to extent practicable," while avoiding erosion; site designed to minimize contact of waste with standing water (61.51)	desireable objectives, but no specific criteria; with compacted, mounded 8' thick clay covers at West Valley, water continues to infiltrate; cannot have well-drained property without water percolating through and contacting waste, unless engineered barriers used
chelating agents have dissolved normally insoluble americium, cesium, strontium, plutonium, and cobalt and caused them to migrate out of the trenches	—	no prohibition against chelating agents
lack of funds for long-term care, which has passed the financial burden from the companies to the state and federal taxpayer	applicant provides assurance that sufficient funds will be available (61.62); state must assume control of site for up to 100 years following site closure (61.59)	specific funding mechanisms not required by NRC, only vague assurances; no third party liability requirements; waste will remain hazardous for 300 years or longer

The NRC has attempted to correct past problems with new siting regulations for radioactive landfills, called 10 CFR Part 61. The overall NRC objectives are commendable: to identify sites that can be easily characterized and modelled, have sufficient depth to the water table, and are well-drained and not erosion-prone. To avoid cap slumpage, the regulations require stronger containers for the waste and minimization of void spaces in the trenches when waste is buried. The regulations require a buffer zone around the perimeter of the property. Taken all together, the objective of the regulations is to keep water away from the waste, and to lengthen the migration time to the site boundary so that the dose to the public is greatly reduced.

The regulations, however, are too vague to do the job--almost all specific numbers are removed (see Table 2 for a review of the regulations). The NRC has essentially decided that the licensing process will determine whether its objectives will be satisfied at a particular site. Without specific numbers in the regulations, the process will inevitably focus on the credibility and opinion of expert witnesses. This means that regulations could vary from state to state and that the public will be left out of the decision-making process. Any numbers that are specified in the regulations are either too high or too low. For example, after the site is closed, the time period for which a state must monitor and maintain the radioactive landfill, called the "institutional control period," is 100 years. Yet some radioactive materials with hazardous lives from hundreds to hundreds of thousands of years will clearly outlive this 100-year period. The regulations also limit the maximum off-site radiation dose to a person at 25 millirems per year, a dose which is much too high for a 100- or 1,000-year radiation source. In contrast, at operating reactors, exposure limits are ten millirems per year maximum.

Alternatives to Radioactive Landfills Needed

Due to the continuous problems of finding safe methods for isolating nuclear waste, the amount of hazardous materials we generate must decrease. Many opportunities exist for energy conservation and for replacement of radionuclides with suitable alternatives. Then, to care for this decreased amount of radioactive materials, long- and short-lived radionuclides must be segregated at the source when feasible. The short-lived materials should be allowed to decay to non-hazardous levels on-site if space is available. Voluminous materials like contaminated clothing and paper can be super-compacted, and stored in centralized or regional above-ground storage facilities with a system to collect leakage.

The NRC needs to rapidly implement regulations to assist the siting of above-ground storage facilities, and other viable alternatives, since the current regulations assume only landfilling. The longer-lived and more hazardous "low-level" waste should be reclassified as high-level waste and sent to a federal repository when one is available.

A wise, comprehensive waste management plan can do away entirely with radioactive landfills. Citizens need to pressure state and federal agencies and elected officials to get on with the job.

For more details on alternatives to landfills, see "'Low-Level' Nuclear Waste: Options for Storage," for $1.00 each, 25 or more $.25 each.

c 1985. Sierra Club Radioactive Waste Campaign. To find out more about the Campaign and for a free listing of our available resources, write us at: 78 Elmwood Avenue, Buffalo, New York, 14201, (716) 884-1000.

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STATEMENT BY DR. MARVIN RESNIKOFF, STAFF SCIENTIST AND CO-DIRECTOR, SIERRA CLUB RADIOACTIVE WASTE CAMPAIGN
before the
HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
AMENDMENTS TO THE LOW LEVEL RADIOACTIVE WASTE ACT
March 8, 1985

Good afternoon. My name is Marvin Resnikoff. I am a physicist and co-director of the Sierra Club Radioactive Waste Campaign, a component of the Club focussing primarily on nuclear waste issues, including radioactive landfills and nuclear fuel transportation. Our main office is located in Buffalo, New York, 35 miles North of the West Valley site, home of a defunct nuclear reprocessing plant, two radioactive burial grounds, and underground high level waste tanks. The commercial landfill operated

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until 1975 when radioactive contaminants broke through the trench cover and spilled out of the trenches. To prevent a recurrence, over three million gallons of contaminated water have now been pumped from the trenches, and treated. At the NRC-licensed burial ground formerly used by the reprocessing plant, plutonium has so far migrated 60′ from burial holes. Out of concern for radioactive contamination from leaking landfills, and other radioactive issues, the Sierra Club Board of Directors established the Campaign to provide educational materials and resources for citizen groups and local and State officials. We have been researching and writing on these issues now for 11 years. With your permission, I would like to submit for the record our review of U.S. radioactive landfill experience.

I′ll limit my remarks to the need for sharpening the definition of low level waste. The basic difficulty is that low-level waste covers a broad range of materials, with hazardous lives from hours to hundreds of thousands of years, and with concentrations that vary by a factor of ten billion. Most believe that low-level wastes are just booties and contaminated clothing. If that were the case, we would not be here today. As can be seen in Table 2, biowaste, or radioactively-contaminated animals used in research, can have average radioactive concentrations of 0.2 Ci per cubic meter, while the radioactivity in reactor components can be 20,000 times more concentrated. Yet, under the Nuclear Regulatory Commission (NRC) regulations, 10 CFR Part 61, all of this is considered low-level waste, and can be disposed of in a surface landfill. In most countries, these more radioactive materials are called intermediate level waste and are handled with greater care. These alternative methods of waste management are discussed in our fact sheet, "'Low-Level' Nuclear Waste: Options for Storage," which I would like to submit for the record.

In addition to this range of concentrations, we also have a tremendous spread in hazardous lives. By hazardous life, I mean the time for the radioactive concentrations of these materials to decay to the NRC's maximum permissible concentrations, as specified in 10 CFR Part 20, Appendix B, Table II. This section of the NRC regulations specifies maximum radioactive concentrations that can reach the public, so that no member of the public can receive a whole body radiation dose greater than 500 millirems per year. As you can see in Table 3, which singles out the more radioactively concentrated materials, the hazardous lives can vary from 180 years to greater than 100,000 years. Ion exchange resins and filter sludges, used to clean reactor water, have hazardous lives on the order of 470 to 500 years. Reactor components and resins from decommissioning reactors have hazardous lives greater than 100,000 years. Clearly this type of waste does not belong in a surface landfill. They should be safely stored until a high level waste repository is operational. As a first cut, Table 3 separates out low-level waste streams which comprise a total of 16% of the low-level waste volume, yet constitute almost 99% of the radioactivity. The "other" category in

Table 3 constitutes 84% of the volume and only 1.2% of the radioactivity. It's quite striking that such a small volume contains almost all the radioactivity. As seen in Table 4, most of the radioactivity in low-level waste, 2/3, comes from the nuclear power industry; a mere 0.14% comes from hospitals and research institutions. In sum, the definition of low-level waste must be sharpened to remove this long-lived, highly radioactive component from surface waste facilities.

The definition of low-level waste is imprecise in one other way -- some materials can be categorized as class B low-level waste under 10 CFR Part 61, and also be classed as high level waste, under 10 CFR Part 60. Waste that fits these two categories is produced at Union Carbide Corporation (UCC), in Tuxedo, New York, north of New York City. The UCC facility produces molybdenum-99 for hospitals and operates almost identical to a reprocessing plant. Irradiated fuel is dissolved in acid, and rather than plutonium, molybdenum is chemically separated. Much of the resultant fission product is sent to the government's Savannah River Plant, where the uranium is recovered, but some of the fission product, including 50% of strontium-90, is solidified, placed in drums, called low-level waste and sent to the Barnwell landfill. Despite NRC misgivings, this waste should really be reserved for a high level waste repository, under 10 CFR Part 60.

Finally, the chemical nature of low-level waste is not recognized by 10 CFR Part 61, and is therefore not well regulated. As one example, some chemicals, called chelating agents, used to decontaminate reactor components, facilitate the mobility of other radionuclides in a landfill. Formerly insoluble materials are dissolved in the presence of very small quantities of chelating agents. At Maxey Flats, Ky. and West Valley, N.Y., chelating agents have dissolved cobalt-60 and plutonium, allowing these formerly insoluble radionuclides to move as rapidly as water. Plutonium has migrated over 60 feet at West Valley, and a major effort is underway by the Department of Energy to prevent it from reaching surface streams.

A more precise definition, and removal of these hotter components, of low-level waste, would allow States in the Northeast and Midwest, to proceed with above-ground storage or alternative waste facilities that had a reasonable lifetime, closer to the 100 year institutional period indicated in the NRC regulations. Siting such facilities would break dependence on the Barnwell and Hanford landfills, and remove the greatest obstacle to the formation of interstate compacts.

Table D.1 Waste Sources and Streams

Nuclear Fuel Cycle	Abbreviation
Central Station Nuclear Power Plants	
Ion Exchange Resins	IXRESIN
Concentrated Liquids	CONCLIQ
Filter Sludges	FSLUDGE
Cartridge Filters	FCARTRG
Compactible Trash	COTRASH
Noncompactible Trash	NCTRASH
Nonfuel Reactor Core Components	NFRCOMP
Decontamination Resins	DECONRS
Fuel Fabrication Facilities	
Process Wastes	PROCESS
Compactible Trash	COTRASH
Noncompactible Trash	NCTRASH
Uranium Hexafluoride Plants Process Wastes	PROCESS
Nonfuel Cycle	
Institutional Facilities	
Liquid Scintillation Vials	LIQSCVL
Absorbed Liquid Waste	ABSLIQD
Biowaste	BIOWAST
Trash	COTRASH
Industrial Facilities	
Waste from Isotope Production Facilities	ISOPROD
High Activity Waste	HIGHACT
Tritium Production Products Manufacturing Waste	TRITIUM
Sealed Sources	SOURCES
Accelerator Targets	TARGETS
Source and Special Nuclear Material Waste	SSWASTE
Source and Special Nuclear Material Trash	SSTRASH
Low Activity Waste from Various Sources	LOWASTE
Low Activity Trash from Various Sources	LOTRASH

TABLE 2. LLW GENERATED TO YEAR 2000

WASTE CATEGORY	VOLUME (M**3)	CONC. (CI/M**3)	CURIES	% VOL.	% CI
P-IXRESIN	146842.00	1.62	237884.04	4.35	0.82
P-CONCLIQ	243000.00	0.10	26487.00	7.21	0.09
P-FSLUDGE	4280.00	1.06	4536.80	0.12	0.01
P-FCARTRG	21800.00	1.86	40548.00	0.64	0.13
B-IXRESIN	76300.00	4.63	353269.00	2.26	1.21
B-CONCLIQ	210000.00	0.27	58170.00	6.23	0.20
B-FSLUDGE	169000.00	5.24	885560.00	5.01	3.05
P-COTRASH	424000.00	0.02	9446.72	12.58	0.03
P-NCTRASH	218000.00	0.52	114450.00	6.47	0.39
B-COTRASH	426000.00	0.02	10011.00	12.64	0.03
B-NCTRASH	99000.00	3.79	375210.00	2.93	1.29
F-COTRASH	236000.00	5.58e-06	1.31	7.00	4.54e-06
F-NCTRASH	41700.00	5.33e-06	0.22	1.23	7.66e-07
I-COTRASH	282000.00	0.11	31866.00	8.37	0.10
N-SSTRASH	360000.00	1.12e-05	4.03	10.68	1.39e-05
N-LOTRASH	101000.00	0.03	3565.30	2.99	0.01
F-PROCESS	78100.00	1.08e-04	8.43	2.31	2.90e-05
U-PROCESS	28200.00	3.80e-04	10.71	0.83	3.69e-05
I-LQSCNVL	98300.00	9.60e-03	943.68	2.91	3.25e-03
I-ABSLIQD	11200.00	0.19	2228.80	0.33	7.68e-03
I-BIOWASTE	31400.00	0.20	6468.40	0.93	0.02
N-SSWASTE	63400.00	2.17e-04	13.75	1.88	4.74e-05
N-LOWASTE	60400.00	0.02	1274.44	1.79	4.39e-03
L-NFRCOMP	2890.00	4040.00	1.16e07	0.08	40.25
L-DECONRS	35000.00	156.00	5.46e06	1.03	18.82
N-ISOPROD	5200.00	15.00	78000.00	0.15	0.26
N-HIGHACT	2610.00	210.00	548100.00	0.07	1.88
N-TRITIUM	3490.00	2330.00	8.13e06	0.10	28.03
N-SOURCES	187.00	5760.00	1.07e06	5.55e-03	3.71
N-TARGETS	1340.00	80.40	107736.00	0.03	0.37
TOTAL	3.48e06		2.92e07		

TABLE 3. LOW LEVEL WASTE, INCLUDING DECOMMISSIONED REACTOR WASTE, GENERATED TO THE YEAR 2000[a]

WASTE CATEGORY	VOLUME (M**3)	CONC. (CI/M**3)	CURIES	% VOL.	% CI	HAZARDOUS LIFE(YRS)
ION EXCHANGE RESIN-PWR	146842.00	1.62	237884.04	4.35	0.82	470
ION EXCHANGE RESIN-BWR	76300.00	4.63	353269.00	2.26	1.21	500
FILTER SLUDGE-BWR	169000.00	5.24	885560.00	5.01	3.05	480
NON-COMPACTIBLE TRASH-BWR	99000.00	3.79	375210.00[b]	2.93	1.29	470
REACTOR COMPONENTS	2890.00	4040.00	1.16e07	0.08	40.25	>100000
DECONTAMINATION RESINS	35000.00	156.00	5.46e06	1.03	18.82	>100000
ISOTOPE PRODUCTION	5200.00	15.00	78000.00	0.15	0.26	680
HIGH ACTIVITY WASTE	2610.00	210.00	548100.00	0.07	1.88	>100000
TRITIUM PRODUCTION WASTE	3490.00	2330.00	8.13e06	0.10	28.03	240
SEALED SOURCES	187.00	5760.00	1.07e06	5.55e-03	3.71	>10000
ACCELERATOR TARGETS	1340.00	80.40	107736.00	0.03	0.37	181
OTHER	2.95e06		71572.80	84.00	1.20	
TOTAL	3.48e06		2.92e07			

1.07e06 = 1.07 x 10^6 = 1,070,000

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[a] Datafrom Draft Environmental Impact Statement on 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," Nuclear Regulatory Commission, Washington, D.C., NUREG-0782, App.D, September 1981.

[b] Can be reduced in volume with supercompactors.

TABLE 4. LLW GENERATED TO THE YEAR 2000[a] INCLUDING DECOMMISSIONED REACTOR WASTE

WASTE CATEGORY	VOLUME (M**3)	CURIES	% VOL.	% CI
REACTORS & ASSOC CO'S	2.45e06	1.92e07	73.19	65.78
INDUSTRIAL	474000.00	9.94e06	14.16	34.06
INSTITUTNL	423000.00	41500.00	12.63	0.14
	3.34e06	2.91e07		

2.91e07 = 2.91×10^7 = 29,100,000

[a] Data from Nuclear Regulatory Commission, Draft Environmental Statement on 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste" NUREG-0782, Appendix D, Washington, D.C., September 1981.

SIERRA CLUB

radioactive waste campaign
fact sheet

"Low-Level" Nuclear Waste: Options for Storage

Legislators, policy makers and citizens are rushing to meet a deadline of January 1986 set by the U.S. Congress (Low-Level Radioactive Waste Policy Act) when regional solutions to the "low-level" nuclear waste problem must be in place. The imminence of this unrealistic deadline has forced decision makers to opt for the quick fix, disposing of all "low-level" waste in burial grounds.

Burial grounds differ little from garbage-type landfills. Waste generators believe landfills can somehow be made to work. But they are not a viable option. In moist areas, water runoff and underground migration inevitably bring water into a landfill and carry out poisonous chemical and radioactive substances.

Waste generators and the Nuclear Regulatory Commission (NRC) consider all "low-level" waste the same. But it is not. Some is extremely radioactive and long-lived, requiring monitoring and maintenance for thousands of years; other waste is slightly contaminated and short-lived. These "low-level" waste streams should not be "disposed of" in the same place, using the same basic technology—shallow landfills.

A sound "low-level" waste management policy calls for segregating radioactive waste at the point of generation and storing it above-ground. While the waste is stored above-ground, we can be assured of no leakage into our ground water. The waste can be easily monitored and protected. Short-lived waste will decay to non-toxic levels.

THE WASTE STREAM MUST BE SEGREGATED AT THE POINT OF GENERATION

Each of the different types of "low-level" waste have specific characteristics and require specific storage techniques.

Reactor waste, which accounts for 24% of the radioactivity of "low-level" waste sent to burial grounds[1], falls into two radically different categories. Wet waste which consists of ion exchange resins and sludges, and dry waste which consists of clothing, rags and tools. By volume, power reactors account for about 54% of the waste stream.

Wet Waste Resins and irradiated components, such as control rods, make up over 95% of the radioactivity in reactor "low-level" waste.[1] The nuclear industry tends to talk only in terms of volume when discussing "low-level" waste. This is misleading. The radioactivity, longevity and chemical composition of the material must be an integral part of a sound waste management policy.

Resins are a media with the consistency of caviar. They are used to purify the water that circulates around the fuel in the reactor. Of particular concern is cesium-137, which is water soluble, and therefore, readily migrates out of the nuclear fuel into the surrounding cooling water. Because of this solubility, the substance will also readily migrate out of a burial ground. An average reactor produces 500 curies* of cesium-137 per year.[1,2] With 80 operating nuclear power plants in the U.S., about 40,000 curies of cesium-137 are shipped to burial grounds each year.

Besides cesium-137, another dominant component of reactor wet waste is cobalt-60. These two isotopes have half-lives,* respectively, of 30 and 5 years and must be sequestered from the environment for at least 300 and 50 years, respectively. These wet wastes, because of their toxicity, longevity and mobility in the case of the cesium-137, should not be dumped in landfills. They should be temporarily stored in bunkers, preferably above-ground, carefully monitored and subsequently, isolated in a high-level waste repository, when one is available.

Dry wastes These are generally only slightly contaminated materials that can be compacted: Some of these materials conceivably could be incinerated because the radioactivity could be trapped on filters as in done in Canada (see page 4). The difficulty with incinerating the dry wastes of the nuclear reactor "low-level" waste stream is that, if an incinerator were operating, nuclear utilities would press to also have the resins and sludges incinerated. This would pose an unacceptable health hazard to surrounding communities because of the large amounts of cesium and other isotopes going up the stack, material which could not be entirely trapped on stack filters.

If not incinerated, the dry wastes of a reactor should be compacted and stored in bunkers.

*see glossary.

Is it feasible? Can the wet waste stream be separated from the dry waste stream at the reactor? Yes. It is already being divided prior to transport. Because of high radiation levels of resins, these materials are currently transported in shipping containers separate from the steel drums and wooden crates used for dry wastes. Current practice is that, in these separate shipping containers the wet and dry wastes are sent to the same burial grounds, and buried together. This segregation, initiated at the reactor for transport purposes should be used for storage purposes as well, as is done in Canada[3] (see page 4).

Industrial Waste These account for 73% of the radioactivity of the "low-level" waste going to burial sites.[1] In this category fall two large producers of isotopes for medical and research purposes: New England Nuclear (MA) and Union Carbide (NY) which, respectively, account for 24% and 15% of the total radioactivity of the nation's "low-level" waste. New England Nuclear's waste is primarily tritium, producing *120,000 curies per year.* Since tritium behaves exactly like water, it cannot be isolated in a landfill. This waste should be stored in above-ground bunkers for at least 100 years.

Union Carbide's waste consists of all the radionuclides represented in irradiated fuel. By no stretch of the imagination can this waste, which is dominated by the long-lived isotopes such as strontium-90 and cesium-137, be classified as "low-level." This is waste, which along with the resins and sludges from reactors, should be isolated in above-ground storage bunkers, temporarily (20-50 years) and then moved to a high-level waste repository. By volume, industrial waste accounts for about 11% of the total stream.

Institutional Waste, which accounts for about one-third of the volume of waste presently going to commercial burial grounds, consists of materials both from hospitals and research institutions. These two waste streams are significantly different from one another with medical waste dominated by short-lived materials such as technetium-99m with a half-life of six hours and the research waste stream consisting of long-lived materials such as carbon-14 and tritium with half-lives, respectively, of 5,000 and 12 years. Other shorter-lived materials are also included in institutional waste. The medical waste, with less than one percent of the radioactivity in "low-level" waste, lends itself to being stored in above-ground facilities for about three years until it has decayed to levels low enough to be disposed of as regular trash. Dartmouth College has a program (described in detail on page 4) which offers considerable promise for other similiar institutions. Hospitals in cities should follow Dartmouth's example by using a centralized storage location for isotopes for the necessary decay period.

Box 1

Status of Radioactive Landfills[1]

Site	No. of acres (through 1982)	Radioactivity buried (through 1982)[2]	Status
Barnwell, S.C.	20.3	2,145,000 curies	operating; no trench water collection due to sandy soil; Southeast compact requires closure of site by 1992.
Beatty, Nev.	11.6	452,000 curies	operating; semi-desert area; accepts only 2% of nation's waste.
Maxey Flats, KY.	40.0	2,406,000 curies	closed December 1977 when unused trench found radioactive; plutonium found ¾ mile from site.
Richland, Wash.	46.2	1,075,000 curies	operating; semi-desert area.
Sheffield, Ill.	3.9	60,206 curies	closed April 1978; tritium moved more than 500' and offsite; gullies up to 3' deep due to erosion.
West Valley, N.Y.	3.0	739,000 curies[3]	closed March 1975 when radioactive water broke trench cover and overflowed.

[1] Data from (DOE, 1983)

[2] Radioactivity at time of burial, not corrected for decay. Total does not include plutonium.

[3] Total does not include 500,000 curies in adjacent burial ground used by Nuclear Fuel Services' reprocessing plant.

LANDFILLS LEAK

An erroneous assumption dominating current "low-level" waste planning is that landfills can be prevented from leaking. The history of both radioactive and chemical landfills in humid climates does not substantiate this claim.

The unlined dump, and even the double liner approach, using a leachate* collection system, have failed in areas of average rainfall (30-40 inches per year). Experts, such as Dr. Peter Montague at Princeton University, Center for Energy and Environmental Studies have stated,

> "We found that four state-of-the-art landfills in New Jersey developed leaks within one year. I think the whole idea of secure landfills is really a figment of optimistic imaginations."

The track record of radioactive landfills in humid areas, has similarly been poor (see box 1). Of six commercial sites which have operated in the United States, three are now closed because of problems: Maxey Flats, Kentucky; West Valley, New York; and Sheffield, Illinois. All three have had water infiltration into trenches, slumpage of trench covers and erosion. At each site, radioactivity has migrated and expensive remedial actions are continuing. The major operating radioactive landfill for the country, Barnwell, South Carolina, is located in a high rainfall area. It has not had buildup of radioactive leachate because of the porous, sandy trench bottom which allows radioactive water to drain out into the environment. Tritium has been detected 45 feet from the burial trenches at Barnwell. The other operating sites, in Beatty, Nevada and Richland, Washington, both located in semi-arid regions, have apparently not had the same problems as at other sites.

Leaking radioactive landfills are not acceptable to the general public. The definition of a "safe" level of radiation has changed drastically over time as we have learned more about radiation and human health. Most physicians agree now that it is the accumulation of low-level radiation doses which is hazardous. We still do not know the exact dose which causes cancer, though we do know that there is a direct correlation between the amount of radiation received by humans and the incidence of cancer.[4]

ABOVE-GROUND STORAGE IS PREFERABLE

Above-ground storage avoids the health hazard of leaky burial grounds and avoids the high cost associated with remedial action that, inevitably, will be required at failed burial grounds. Above-ground structures permit storage in a facility that can be easily repaired. While, over time, concrete may deteriorate, cracks may develop, or operational error may cause leakage, problems can be quickly detected and remedied. Above-ground structures can be designed in such a way as to provide a double barrier which can be used to isolate leakage and prevent it from moving into ground water.

The nuclear industry and its boosters have fabricated a number of disadvantages to above-ground storage: cost, nonpermanence, reliance on institutional controls, sabotage, even plane crashes. Many of these arguments, discussed in box 2, are simply red herrings. The industry, in advocating radioactive landfills, is promoting an "out-of-sight, out-of-mind" solution. But as the operating record at three closed sites has made one point abundantly clear: **residents and taxpayers always pay in the end for leaky landfills.**

ABOVE-GROUND STORAGE IS PRACTICAL AND FEASIBLE

Above-ground structures are being used by utilities operating power reactors in the United States and Canada,[3] and by medical and research institutions. The Tennessee Valley Authority (TVA) has built above-ground storage modules at the Sequoyah Nuclear Plant near Chattanooga, Tennessee.[2] Several utilities in the Northeast are designing and building on-site, above-ground storage facilities. Vermont Yankee in Vermont, Pilgrim I in Massachusetts and Susquehanna in Pennsylvania are all moving in this direction.

TVA ABOVE-GROUND STORAGE

Presently, the TVA ships "low-level" radioactive waste to the Barnwell, South Carolina landfill. Because of the near-term uncertainty of space at Barnwell, the NRC approved and TVA has partially constructed an above-ground storage facility at the two Sequoyah nuclear reactors located on the Tennessee River, 18 miles northeast of Chattanooga. The TVA above-ground storage facilities are not much more complicated than a large concrete box, called a module, with special features to collect radioactive leakage and to shield workers.

The storage modules are constructed, as needed, of reinforced concrete with an inner decontaminable coating. The modules are large, rectangular boxes, 34' wide, 195' long and 19½' high. The thickness of the concrete floor slab is 39½", while that of the caps and walls is 24". Modules for the storage of resins are almost twice as thick—42". According to TVA plans, eight resin storage modules and five trash modules will be located on a 20-acre area. There are four compartments in each module. Each compartment contains a liquid drainage system and sampling valves. Any radioactive liquids can be collected and repackaged, or taken to the nuclear plant for processing. Filters and booties that are less radioactive are stored in 18-gauge, steel drums or boxes. The more radioactive exchange resins are stored in more rugged carbon steel cylinders coated with epoxy.

A giant mobile crane straddles the entire concrete module, running along curbed concrete sidewalks on each side of the module. Module loading/unloading steps, through use of the rubber-tired, diesel-powered gantry crane, are shown in box 2. The highest radiation doses are received by crane operators, though the concrete shielding reduces the levels. Since the storage facility is located about 200' from the site boundary, the doses to the public were expected to exceed the NRC hourly radiation limits while the cover is off the storage module. Above-ground storage units can be located so that public exposure is not necessary.

The above-ground storage facility is of substantial construction and is expected to remain functional for several decades. The NRC will, however, only license above-ground storage facilities for a five-year period. This limit will need to be extended for the above-ground storage to be implemented. The NRC has no technical justifications for this limit.

ONTARIO HYDRO EXPERIENCE

Ontario Hydro operates eight nuclear reactors with a total capacity of 5,100 MW(e), with an additional eight reactors under construction.[3] The Canadian reactors, called CANDU reactors, are different than U.S. reactors which must be shut down for refueling every 12 to 18 months. The CANDU reactors are fueled while the reactor is operating. Defective fuel leaks radioactivity into the cooling water. In the CANDU reactors, this fuel can be promptly replaced. This means the CANDU generates about one-half of the "low-level" waste that U.S. reactors produce for the same electrical output.

In the Ontario Hydro system, there are four reactors at each site. A central storage area, the Waste Operations Site, located at the Bruce plant near Tiverton, Ontario, will service all 16 Ontario Hydro reactors.

At each reactor site, the resins are slurried into large (three cubic feet) carbon steel cylinders. These sit upright in shipping containers and are sent to Bruce for storage. These resins, along with water purification filters, are stored either in tile holes or Quadricells.

The tile holes are located underground; they are cylindrical, concrete storage containers, each of which holds two ion exchange resins. After loading, the containers are backfilled with concrete. A leachate collection system and monitoring system are utilized at the bottom of the tile holes. As part of Ontario Hydro's waste management plan, when the resins and filters have cooled to the point where radiation levels are less than one rem per hour, the cylindrical container and concrete backfill will be lifted in one piece and transported to an above-ground storage building (see photo page 5).

Resins are also stored in Quadricells, heavy concrete vessels which are placed in an above-ground concrete room 8' by 8' at its base, and 18' high, similar to a cemetery mausoleum. The roof is sloped to aid water runoff. The walls and floors are 2' thick, and, with the inner concrete cylinders, sufficient to shield workers and to withstand impacts from airplane crash, or tornado-borne utility poles. Fifteen Quadricells are placed in an area about 20' wide by 272' in length. The minimum design life is 50 years.

The Ontario Hydro system for storing resins is clearly far superior to the U.S. system in which these radioactive, water soluble materials are dumped in leaky landfills.

Also in use by Ontario Hydro are inground concrete trenches. These are for dry waste which is compacted and non-combustible and for radioactive ash that is generated by incineration of slightly contaminated materials such as clothing and papers. These concrete trenches are 10' wide, 10' deep and 125' long. The concrete lid is one foot thick; the trench walls are somewhat thicker. The trench slopes to a sump and standpipe which allows for water detection and removal.

The above-ground storage building in the Ontario Hydro system is for wastes with radiation levels of less than one rem per hour. Both resins and lower-level wastes in the concrete trenches will eventually be stored here. This building is a prefabricated concrete warehouse with walls 1¼' thick and a concrete roof ½' thick. The building dimensions are 164' long by 98' wide by 26' high. The building has smoke detection equipment, carbon dioxide fire extinguishers and an internal drainage system.

DARTMOUTH COLLEGE

Dartmouth College in Hanover, New Hampshire produces "low-level" radioactive waste in medical and scientific research and at the College hospital.[5] In the past, this waste was shipped to commercial radioactive landfills in Richland, Wash. and Barnwell, S.C. While the volume produced between 1977 and 1982 remained stable (120 to 150 55-gallon drums per year), the cost of disposal increased by a factor of seven in this five year period.

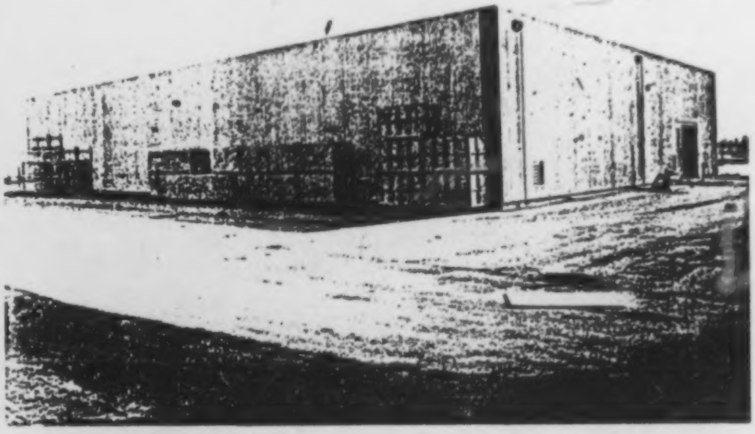
Like most medical and research institutions, the radioactive waste can be placed into five categories: liquid, solid, liquid scintillations vials (LSV), animal carcasses and other. For liquids containing less than 100 microcuries per liter of radioactivity, this waste, containing tritium and Iodine-125, is disposed of into the sewer. Liquids containing more than 100 microcuries per liter are stored in one-gallon containers within a lined 30-gallon drum. This waste is primarily Iodine-125 (half-life: 60 days) and phosphorus-32 (half-life: 14.3 days), and is stored for ten half-lives.

Solid waste, consisting of disposable plastic and glass items, and contaminated paper, is placed in a lined 55-gallon steel drum and compacted to reduce the volume. A drum typically contains a few millicuries of tritium, sulfur-35, chromium-51 and iodine-125, and is stored for at least ten half-lives, or approximately 2.4 years. After this storage period, 55-gallon drums containing less than a millicurie of tritium, will be disposed of as regular trash.

Glass and plastic liquid scintillation vials are put into a lined 55-gallon drum for temporary storage. A shredder-crusher is used to separate the liquid, containing tritium, carbon-14, phosphorus-32, sulfur-35 and iodine-125, from the plastic and glass. Vials containing shorter-lived radionuclides are separated from those with tritium and carbon-14, and are stored for ten half-lives. The vials containing tritium and carbon-14 below minimum NRC levels and are disposed of as regular trash.

Carcasses, mainly rats, are first stored in a cooler. If the carcasses contain iodine-125, they are placed in a freezer for sufficient decay (5 to 10 half-lives). Carcasses containing minute amounts of tritium and carbon-14 are incinerated.

*see glossary.



An above-ground storage building in the Ontario Hydro system. Both resins and lower-level wastes will eventually be stored here.

Other waste from special experiments may contain up to one to three curies of tritium. This waste, managed on a case-by-case basis, is packed separately and shipped to a commercial burial site.

Based on the production rate of radioactive waste and the management methods mentioned above, Dartmouth College built a storage building capable of holding 240 drums, with expansion space for future needs. The storage building is a reinforced concrete structure 24' wide, 98' long and about 11' high. The walls are one-foot thick, insulated and faced with a brick veneer. To collect leakage, the floor slopes toward the center where a collection pit is located. With the doors set four inches above floor level, the room will hold about 800 gallons of fire water. A telephone and fire alarm pull station provide added safety and the building is equipped with heat detectors.

The cost of the whole building, 2/5 of which is used for waste storage, was $125,000. Dartmouth estimates that the yearly cost of the storage facility, including operating and equipment costs, are less than the disposal costs at a radioactive landfill.

As a result of this waste storage program and the short-lived nature of medical and research wastes, almost no radioactive waste is shipped to a radioactive landfill.

CONCLUSIONS

These examples of above-ground storage show that the technology is available. Above-ground storage will be resisted by utilities because of higher initial costs and because it will require the utility to maintain long-term responsibility for the wastes, rather than thrusting the long-term responsibility off on an unsuspecting state and its taxpayers.

Some of the questions that need to be resolved are how many above-ground storage sites should be developed? Should these be at the reactor sites? What should be the design life of these facilities? Should above-ground storage operate in tandem with an incineration facility strictly limited to reactor dry wastes? It is clear that further research needs to be done on these questions. It is also clear that utilities and state governments must break off their love affair with out-of-sight, out-of-mind shallow landfill "solutions." It is time to re-think the "low-level" waste problem.

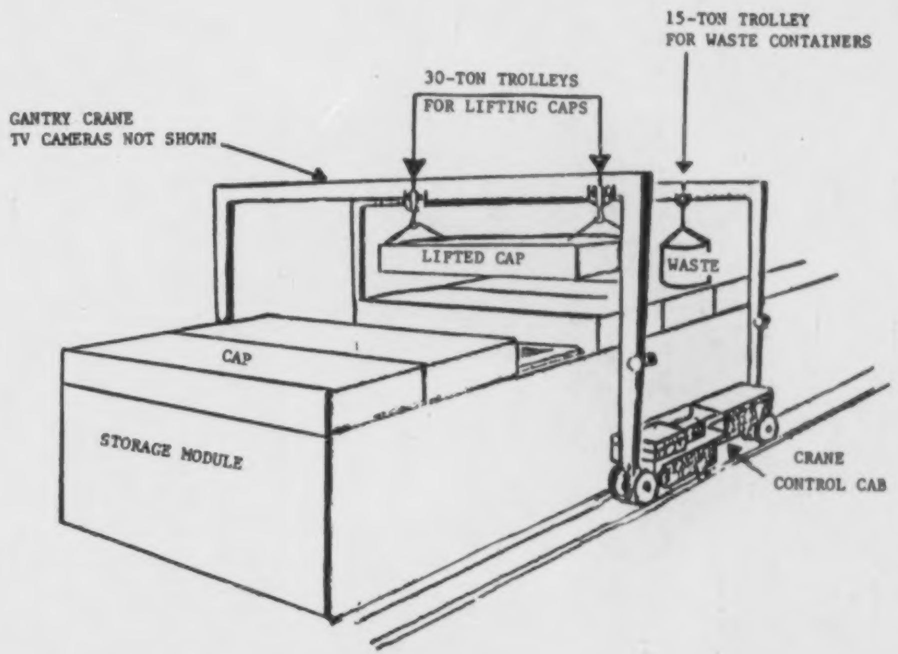
Above-Ground Storage in Engineered Structures Advantages and Disadvantages

Advantages

- Avoids shallow land burial, which, in areas of high precipitation, inevitably results in off-site migration of radioactive materials.
- Can be easily monitored.
- Can be relatively easily repaired.
- Radioactive waste can be transferred to a permanent disposal site without high radiation exposure to workers, particularly if the same concrete or steel module in which the material is stored is also used to transport the waste to the permanent location.
- Reduces expenses for long-term remedial action or exhumation at leaking shallow burial sites.
- Site selection criteria can be less rigorous because geologic and hydrologic factors are less important with above-ground engineered structures.
- May make interim site selection less time consuming and contentious.
- Reduces exposure of the public to radioactive materials.

Disadvantages

- Cost. In the short term, above-ground bunkers will be more expensive than a large regional burial ground. Comment: These short term savings will be insignificant compared to the very high long-term remedial action costs necessitated by shallow land burial.
- It is not a "permanent" solution. Comment: Although land burial is often touted as a "permanent" solution, it is not. A leaking burial ground that must be monitored and repaired for 300 years, and perhaps exhumed, is not a permanent solution. It gives the current crop of officials the out-of-sight, out-of-mind illusion that they have "solved" a problem.
- Concrete could degrade because of acid rain. Comment: Yes, acid rain is of concern, but above-ground concrete structures have lasted for centuries, and this storage is envisioned as temporary.*
- Relies on institutional control to prevent intrusion after site is closed. Comment: True, but at radioactive landfills, erosion, water infiltration and monitoring will also require institutional control.
- Storage facilities will be subject to sabotage. Comment: this is a red herring. Sabotage is a remote possibility.
- Storage facilities might be subject to a plane crash. Comment: Clearly, other facilities accepted in our society, such as oil storage tanks, chemical plants and stadium-packed sports events, pose a much greater hazard. Another red herring.
- The NRC, currently will not license above-ground storage for more than five years. Comment: True. This time frame needs to be extended.


15-TON TROLLEY
FOR WASTE CONTAINERS
30-TON TROLLEYS
FOR LIFTING CAPS
GANTRY CRANE
TV CAMERAS NOT SHOWN
LIFTED CAP
WASTE
CAP
STORAGE MODULE
CRANE
CONTROL CAB

Box 3: Radioactive waste storage modules at the Sequoyah Nuclear Plant. The storage module cap is lifted with 30-ton trolleys on the mobile gantry crane, operated from the crane control cab. The crane then moves forward on rubber tires along the concrete runway. The rear 15-ton trolley lifts the cask from the transport vehicle and places it in the storage module. Television cameras and remote manipulating equipment enable operators to perform all work remotely at Sequoyah.

FOOTNOTES

[1] Department of Energy, Spent Fuel and Radioactive Waste Inventories, Projections and Characteristics, DOE/NE-0017/2, Washington, D.C., September, 1983.

[2] Nuclear Regulatory Commission, Environmental Impact Appraisal and Safety Evaluation Report of Low-Level Radioactive Waste Storage at Tennessee Valley Authority, Sequoyah Nuclear Plant, Docket No. 30-19101, Washington, D.C., September, 1982.

[3] Carter, T.J., "Radioactive Waste Management Practices at a Large Canadian Electric Utility," In Seminar in Management of Radioactive Waste From Nuclear Power Plants, Karsruhe, West Germany, 5-9 October, 1981, International Atomic Energy Agency, Vienna, Austria 1982.

[4] National Academy of Sciences, BEIR Report, Washington, D.C.

[5] Schori, E., "Dispcsal of Low-Level Radioactive Waste." Presented at League of Women Voters Conference on Low-Level Radioactive Waste, Boston, Mass., November 1983.

GLOSSARY

LEACHATE — The soluble components from waste which leak from a landfill when rain percolates through the trenches. This polluted liquid is called leachate.

CURIES — A unit which measures radioactivity equivalent to 37 billion disintegrations per second.

HALF-LIFE — A period of time required for the disintegration of half of the atoms in a radioactive material.

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Senator **Evans**. Thank you very much.

Ms. Stelluto.

STATEMENT OF JANIS D. STELLUTO, EXECUTIVE DIRECTOR, NELRAD, BOSTON, MA

Ms. **Stelluto**. Thank you, Senator.

My comments today generally represent the views of radioactive materials users from across the country. Most importantly, we urge that concrete decisions be made yet this year. Those decisions will determine the direction for State action and company and institution planning.

My own organization, NELRAD, and our sister organizations have members from hospitals, universities, large and small manufacturers, and electric power companies. Our organization appreciates all the hard work that has gone on to this point, and the collective desire to find a practical way to deal with this complex issue.

Radioactive materials users from across the country strongly support congressional consent to regional compacts, coupled with the passage of the amendments to the Waste Policy Act of 1980. These two important actions meet short-term need for all interested parties. They provide some access to present facilities that demonstrate safe management for low-level waste.

They assure Governors and citizens of host States of the present facilities, that they will not be responsible for all the waste in the country forever. And they recognize the work that has gone into planning for regional compacts and new disposal facilities.

Amendments have potential for significant long-term effects as well. We've long supported the act, with its long-term goal of new regional facility development. We urge that that goal be clearly stated. We further urge that milestones for progress should require decisions and actions by State and regional programs, not merely studies or statements of intent.

The proposed short-term goals in themselves are not without cost and they should not go unnoticed. In the first year, at $10 per cubic foot, the added cost per drum is $75. By the fourth year, that additional cost will be $300 per drum. Those are the costs to generators in States and regions that do comply with the milestones of program development.

We believe that these costly surcharges should serve multiple purposes. We understand that they are proposed as incentives to waste volume reduction and disincentives to delaying new facility development. However, the radioactive materials users pay the full cost without penalty to State or regional programs. We fail to see the pain that Congressman Derrick urged earlier this morning.

Several others today have asked for suggestions for imposing some incentive on State and regional programs. We urge that both the surcharges and the penalties be tied to State and regional actions and offer the following suggestions as possible needs. The State of origin of the waste may collect the surcharge on the waste shipped, to be held in escrow to apply to new facility development within the State or region. We would certainly concede that a part of that full cost should stay within the State, and the balance sent off to the host States.

That escrow fund, however, may be used only after State and regional has demonstrated that the most recent milestone has been met. If the State or region fails to meet meaningful milestones, the amount of money in their escrow fund should then be forfeited to sited States to open negotiation for the already-agreed continued access.

In addition, the penalties should be paid by the State or origin, not the radioactive materials users. We strongly urge that access to well-run centralized disposal capacity should remain available to radioactive materials users. Relief to the sited States should come from new facility development, which should be encouraged by the amendments. We urge that each of the milestones require decisions or actions by the nonsited States and regions, decisions that will lead progressively toward facility construction.

Although we agree that conservation is the first offense on all issues of resources allocation, curtailing use of radioactive materials is not the way to resolve the waste issue. Substitutes for radioactive materials may be more costly, less effective, pose greater risk, and will contribute to yet another waste stream.

Given the public perception and the general fear of radioactivity, selection of radioactive materials for use is the result of already careful risk, cost, and quality assessment. Radioactive materials are a significant ingredient in many growth industries and services that States seek to encourage. Businesses and institutions that use these materials compete for both research money and markets. States without access to disposal capacity will face obstacles in maintaining and attracting this activity.

We appreciate this opportunity to express our concern. We urge decisions to guide our own plans. We further urge that amendments to the 1980 law maintain the intent of the original act, to encourage new regional facility development. Federal law must serve this purpose on an issue that transcends State boundaries and elective administration.

Thank you.

[The prepared statement of Ms. Stelluto follows:]

TESTIMONY TO
UNITED STATES SENATE
SUBCOMMITTEES
ON
ENERGY, RESEARCH AND DEVELOPMENT

HONORABLE PETE V. DOMENICI, CHAIRMAN

AND

NUCLEAR REGULATION

HONORABLE ALAN K. SIMPSON, CHAIRMAN

October 8, 1985

Presented by:

Janis D. Stelluto
Executive Director
NELRAD
549 Albany Street
Boston, MA 02118
617/350-9023

Thank you, Mr. Chairmen Domenici and Simpson and members of the subcommittees, for the opportunity to comment on amendments to the Waste Policy Act, and on the low-level radioactive waste issue. My comments today, generally represent the views of radioactive materials users from across the country.

Most importantly, we urge that concrete decisions be made yet this year. Those decisions will determine the direction for state action and company and institution planning.

My own organization, NELRAD, and our sister organizations of radioactive materials users, have members from hospitals, universities, large and small manufacturers, and electric power companies. Our organizations appreciate the past hard work of your own subcommittees and the work in the House Committees and Subcommittees and your collective desire to find a practical way to deal with this complex issue.

Radioactive materials users from across the country strongly support two Congressional actions on the low-level waste issue this year: Congressional consent to regional compacts, coupled with passage of Amendments to the Waste Policy Act of 1980.

These two important actions meet short-term needs for all interested parties:

1) provide some access to present facilities that demonstrate safe management for LLW;

2) assure governors and citizens of host states of present facilities that they will not be responsible for all the waste from the country, forever; and

3) recognize the work that has gone into planning for new regional compacts and disposal facilities.

Amendments to the Waste Policy Act have potential for significant long-term effects as well. Our organizations have long supported the Act, with its long-term goal of new regional facility development. We urge that that goal be clearly stated in the milestones for progress, a major component of proposed Amendments. We urge that milestones should require decisions and actions by state/regional programs, not merely studies or statements of intent.

The proposed short-term goals in themselves are not without cost, both dollar costs and assumption of major responsibility. We understand reasons for imposing surcharges; however, their dollar costs should not go unnoticed. In the first year at $10/cubic foot, the added cost per drum is $75; by the fourth year that additional cost will be $300 per drum. Those are the costs to generators in state/regions that do comply with milestones of program development.

We believe that these costly surcharges should serve multiple purposes. We understand that they are proposed as incentives to waste volume reduction and disincentives to delay new facility development. However, the radioactive materials users pay the full cost, without penalty to state/regional programs.

We urge that both surcharges and penalties for failure to comply with program milestones be tied to state/regional programs and offer the following suggestions as possible means:

1. State of origin of the waste to collect surcharge on waste shipped, to be held in escrow to apply to new facility development within that state/region - may be used only after state/region has demonstrated that the most recent milestone has been met.

2. If state/region fails to meet meaningful milestones, amount in escrow fund to be forfeited to sited states to open negotiation for the agreed continued access.

3. If state/region fails to meet meaningful milestones, the amount of penalty be paid by the state of origin, in addition to forfeiting the surcharge amount.

We strongly urge that access to well run centralized disposal capacity should remain available to radioactive materials users. Relief to the sited states should come from new facility development, which should be encouraged by the amendments. We urge that each of the milestones require decisions or actions by the non-sited states/regions, decisions that will lead progressively toward facility construction.

Although we agree that conservation is the first offense on all issues of resources allocation, curtailing use of radioactive materials is not the way to resolve the waste issue. Substitutes for radioactive material may be more costly, less effective, pose greater risk and will contribute to another waste stream.

Given the public perception and general fear of radioactivity, selection of radioactive materials for use is the result of careful risk, cost and quality assessment.

- Nuclear medicine procedures are often preferred over surgery to give more complete and accurate information. These procedures take less time and pose less risk to patients than invasive surgical procedures.

- There is no substitute for radioactive material used in smoke and other detection systems or measuring gauges that ensure uniformity such as the thickness of automobile tires and the strength of welds on bridges.

- Tracers give precise information about foodchains and body functions.

- Research projects nearly all require one or more uses of radioactive materials for precision and predictability.

- Nuclear power may be preferable to burning foreign oil supplies or coal.

Radioactive materials are a significant ingredient in many growth industries and services that states seek to encourage. Businesses and institutions that use these materials compete for both research money, and markets. States without access to disposal capacity will face obstacles in maintaining and attracting this activity.

We appreciate this opportunity to express our concerns. I repeat the point most important to us who use radioactive materials; we urge decisions to guide our own plans. We further urge that amendments to the 1980 law maintain the intent of the original Act, to encourage new regional facility development. Federal law must serve this purpose on an issue that transcends state boundaries and elective administrations.

Please call Janis Stelluto at 617/350-9023 with questions or comments.

National NETWORK
of State and Regional Radioactive Material User Groups

The National NETWORK

The National NETWORK is comprised of representatives of state and regional radioactive material user groups. Since 1980, users of radioactive materials have recognized the need to carry out the provisions of the Waste Policy Act, and have formed groups to help organize state programs and regional compacts. The function of these groups has generally been to provide information to the public and designated authorities.

The following groups represent the full range of uses of radioactive material. We are committed to lending effort in support of passage of amendments to the Waste Policy Act and compact consent.

NELRAD - from throughout New England

NYSLLWG - New York

California Radioactive Materials Management Forum

Central States Compact Regional Association for Low-level Radwaste Management

Iowa Users of Radioactive Materials

Pennsylvania RadWaste Working Group

Ohio Radioactive Materials Users Group

New Jersey Business and Industry Association

Maryland Users Group

American College of Nuclear Physicians

Members of the NETWORK groups agree that the following actions must occur this year, if we are to continue to show progress toward establishment of new low-level radioactive waste disposal facilities in the United States.

1) Amendments to the Waste Policy Act of 1980 that allow continued access to present disposal facilities must be enacted.

2) Congressional Consent to Compacts indicating, approval of concept of regional facility development, must be enacted.

ATTACH TO
TESTIMONY OF JANIS D. STELLUTO
October 8, 1985

Our organizations are genuinely pleased that each phase of the legislative process yields some improvements in proposed amendments to the Waste Policy Act of 1980. Several of the component parts of the full amendment package appear to have reached the decision point, and are agreed conditions. On the other hand, other conditions warrant further comment.

Milestones

We view this section of the bill as the critical provision that will guide state and regional programs toward facility construction. We believe that the 1986 and 1990 dates are reasonable program requirements in all versions of the bill. However, we favor the concept that license application should be complete by that date.

We believe that the 1988 milestone has potential for more impetus than stated in any of the versions. Program Milestones should be viewed as action, decision, or enactment of legislation dates. A siting plan is not necessarily any of those. At the same time important decisions should have been made by that date if the 1990 Milestone is to be met. We suggest that serious site work - selection or characterization - should have begun by that date, to allow license application by 1990.

Mr. Udall's bill goes great distance in requiring decisions and actions. We suggest, however, that selection of the host state and selection of site and operator are not equivalent. The more definitive steps should be taken by 1988 to achieve license application status by 1990. We suggest that the OR in line 1 of page 22 of Mr. Udall's August 7 bill be replaced with AND. An alternative suggestion is attached as "mark-up" S.1578.

Surchargos and Penalties

We view this provision of the amendments as the key to success, and as suggested in our testimony suggest that the surcharges be used to modify behavior on the part of states and regions.

We further suggest that if the state of origin of the waste collects the surcharge and then pays the sited state for the privilege of continued access, the message of responsibility is clear. Conversely, the rebate concept allows states of origin to perceive reversed roles.

Although states argue that they have difficulty dedicating funds, we suggest that a way of doing so is not impossible. I attach proposed Massachusetts legislation that allows money to be set aside for specific use.

From there, we suggest that the suggested penalties for failure to comply with Milestones of progress should be paid by non-sited states and regions. States taking possession of the waste or paying the cash penalty have both been recommended. Both methods deliver the proper message.

Exclusive Rights

Our organizations have a long-standing record of favoring regional compacts and regional facilities. We fear that extending the right to exclude out-of-state waste to individual states, as Section 4(d) of Mr. Markey's October 3 bill does, is contrary to the intent of the 1980 law.

Emergency Access

We support NRC determination of emergency access to facilities and favor Mr. Markey's approach.

Interstate Agreement

We favor removal of the Interstate Agreement, as treated in Mr. Markey's bill.

Members of our respective organizations remain available for further comment. Please call Janis D. Stelluto at 617-350-9023 if we may be helpful.

(b) The management board shall ensure that the operator has sufficient funds available to satisfy its responsibilities and liabilities under this section, and for the compensation of injured facility employees; provided that the funds available to satisfy liabilities from third party claims shall be at least equal to the maximum amount available from nuclear insurance pools or other commercial insurers.

(c) Notwithstanding any provision of this section, the management board, council, citizens supervisory committee, DPH and DEQE shall be subject to liability for harm to persons, land or property resulting from the generation, transportation, treatment, storage or disposal of low-level waste only in accordance with the provisions of sections 1 through 13 inclusive of chapter 258, provided that the amount of damages for which liability may be imposed shall not be subject to the limit provided in section 2 of chapter 258.

(d) If all other sources of funds, including federal assistance, have been exhausted, the Commonwealth shall provide the reasonable costs of clean-up and stabilization of a facility.

(e) If no other funds, insurance, tort compensation or other means of satisfying a damage judgment or settlement are available, the contingent liability trust fund established in section 508 shall be utilized to compensate for injuries to persons, land or property resulting from the generation or management of low-level waste. The liability of the fund shall be limited to the amount contained therein at the time a final judgment or settlement awarding such damages is rendered.

(f) If all other sources of funds, including federal assistance, have been exhausted, the Commonwealth shall provide compensation for harm to persons, land or property resulting from the generation or management of low-level waste.

Section 508. (a) There is hereby established a low-level waste contingent liability trust fund which shall be administered by the State Treasurer for the purpose of depositing and investing surcharges remitted by operators pursuant to section 404 and paying compensation pursuant to sections 507 and 603.

(b) There is hereby established a low-level waste institutional control trust fund which shall be administered by the State Treasurer for the purpose of depositing and investing surcharges and the interest thereon remitted by operators pursuant to section 404 and paying institutional control costs pursuant to sections 602 and 603. No portion of the monies contained in the institutional control trust fund may be used to satisfy judgments or settlements awarding damages pursuant to section 507 or 603.

(c) The State Treasurer shall be the trustee of the trust funds established by this section. The amounts held in such funds shall be invested, re-invested and managed by the State Treasurer for the benefit of all citizens of the Commonwealth whose rights under Amendment Article 97 of the Constitution of the Commonwealth are affected by a facility and the residents of site, neighboring and affected communities, and any person who has paid a surcharge for such trust funds pursuant to sections 404 and 504.

Section 509. At least one year prior to the date scheduled for facility closure in the facility closure plan required to be prepared and maintained by regulations issued pursuant to section 106, the operator shall submit such plan to DPH, the management board and the council. Upon acceptance of such plan by DPH and by a two thirds vote of the management board, the operator shall implement such plan according to the closure schedule contained therein. DPH shall, in cooperation with appropriate officials of each site community and according to regulations adopted pursuant to section 106, periodically inspect the operator's implementation of the facility closure plan to ensure that such regulations and the conditions of the facility license are satisfied. The management board shall, in cooperation with appropriate officials of each site community, periodically inspect the operator's implementation of the facility closure plan to ensure that the terms of the comprehensive operating contract are satisfied and that steps necessary to allow the management board to accept transfer of the facility license pursuant to section 602 are taken.

Senator EVANS. Thank you.
Mr. Pasternak.

STATEMENT OF ALAN PASTERNAK, TECHNICAL DIRECTOR, CALIFORNIA RADIOACTIVE MATERIALS MANAGEMENT FORUM, SACRAMENTO, CA

Mr. PASTERNAK. Thank you, Senator Evans. I want to thank you and Chairman Simpson and Domenici and the members of the subcommittees for your invitation to testify as you consider important legislation to preserve and expand the Nation's system for safe disposal of low-level radioactive wastes.

The California Radioactive Materials Management Forum's public and private institutional and corporate members include California's five major electric utilities, universities, hospitals, industries, manufacturerers of radiopharmaceuticals, and professional societies. These organizations use radioactive materials and generate most of the low-level waste in California, and therefore most of the waste in the 13 Western States.

CALRAD Forum's primary objectives are establishing a facility for the safe, reliable and cost-effective disposal of low-level waste and maintaining access to the existing disposal facilities on which we now rely until a facility is in operation in California.

To achieve these goals, the Forum conducts legislative and public information and education programs and facilitates the exchange of information on technical, legislative, and regulatory aspects of low-level waste disposal and management.

In 1983 CALRAD sponsored California Senate bill 342, bipartisan, urgency legislation, authored by Senator Alfred Alquist, Democrat of San Jose, and coauthored by then-assemblywoman, now senator, Marian Bergeson, Republican of Newport Beach. SB 342 was approved overwhelmingly by both houses of the legislature and commits California to establish a low-level waste disposal facility, establishes a process for doing so, and directs the Governor to negotiate entry into a compact or other mutually beneficial interstate agreement.

SB 342 makes California one of the very few States with independent statutory commitments to establish a low-level waste disposal facility. Pursuant to the law, Governor Deukmejian has negotiated a compact with Arizona, and the process to select a facility developer began in the summer of 1984.

Although the legislation to ratify the compact has the same bipartisan authorship as did SB 342, ratification has thus far failed because the State assembly has added a rider which specifies a limited area for the disposal site. On September 30, Governor Deukmejian wrote the members of the legislature, urging ratification when they reconvene in January, and he commented that the site should be chosen based upon geological characteristics, not political boundary lines.

Facility development has been delayed for a year by litigation over the selection of a developer. But just last week, our State administration took a major step and dropped an appeal of a lower court decision bringing the litigation to an end, and allowing developer selection and site selection licensing development to move forward.

The Governor's two actions last week in pledging another attempt to secure ratification of the Western compact and in ending the litigation to move forward on site development are strong evidence to us of his administration's commitment to the compact process and a new disposal facility.

Failure of the States to establish any new facility since the passage of the Low-Level Radioactive Waste Policy Act of 1980 makes essential a congressional compromise between the 19 States that are members of sited compacts and the remaining 31 who are not.

Based on the progress thus far, we are confident that compromise legislation will be enacted this year. Here are brief comments in five areas which have not yet been resolved.

One, CALRAD is a strong supporter of congressional action to prevent dual jurisdiction by the Nuclear Regulatory Commission and the Environmental Protection Agency of the disposal of so-called mixed wastes. We supported the McCain amendment to H.R. 1083, adopted by the Interior and Insular Affairs Committee. The issue is particularly important to California because it affects the operation of the Hanford disposal facility where over 90 percent of our waste is shipped for disposal, where the site operator is under State order to obtain a RCRA permit from EPA.

To avoid dual jurisdiction and conflicting regulations identified here today by both the site operator and the NRC, permitting authority should be with the NRC or the agreement State regulator.

Two, nondiscrimination if access denied. CALRAD's members reflect the great diversity of activities that use radioactive materials. Our board of directors is composed of technical people—physicians, environmental scientists, nuclear scientists. Our policy is that waste ought to be regulated and managed for what it is, not whose it is. All users of radioactive materials that produce low-level waste should be treated equally up to and including denial or suspension of access for State's failure to meet a milestone.

Three, we oppose a recent suggestion in Mr. Markey's version of H.R. 1083 that individual States be allowed to operate new disposal facilities on a restrictive basis in the manner that the 1980 act and consent would allow compacts to operate their regional disposal facilities on a restrictive basis.

CALRAD strongly supports maintaining the compact approach of the 1980 Act. To encourage each State to go it alone will lead to a proliferation of uneconomical, unneeded disposal sites which will undermine confidence in all disposal facilities, even the few large enough to be viable.

Four, State governments should at least share the risks of delay. The various bills now before the Congress put all the risk of delay or failure in establishing new disposal facilities on the users of radioactive materials, not on State government. At best, waste generators will have to pay huge surcharges for limited disposal services and, at worst, we risk loss of access to the existing facilities if progress toward new facilities fails to keep pace with the specified milestones.

The theory that radioactive materials users can pressure their States into timely compliance with Federal policy has yet to be proven. User groups are already doing what we can. Yet, the events of the past year in California show how we are at the mercy of volatile State policies and actions. One year after directing the Governor to obtain a compact, the California Assembly refused to ratify it, except on terms known to be unacceptable to him and the Senate authors. The manner in which the State implemented the developer selection process led to litigation that delayed site development by more than a year.

CALRAD wants to work with the Congress to find a mechanism that will keep the pressure on State governments to expedite the development of new disposal facilities. A requirement that a State take title to waste if a milestone is missed, or a system of using the surcharges for monetary rewards and penalties are possibilities.

Five, we support enactment of a provision for expedited review of license applications for low-level waste disposal facilities by the NRC and the agreement States.

I would be happy to try to answer any questions.

[The prepared statement of Mr. Pasternak follows:]

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ALAN PASTERNAK
TECHNICAL DIRECTOR
CALIFORNIA RADIOACTIVE MATERIALS MANAGEMENT FORUM

Before A Joint Hearing of The

SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT
Of The
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

And The

SUBCOMMITTEE ON NUCLEAR REGULATION
Of The
SENATE ENVIRONMENT & PUBLIC WORKS COMMITTEE

OCTOBER 8, 1985
366 SENATE DIRKSEN OFFICE BUILDING

[illegible]
GA Technologies Inc.
Secretary

Joel I. Cohn
Pacific Gas & Electric Co.
Chief Financial Officer

Richard Riggle, M.D.
Sacramento
Past Chairman

MEDICINE
Robert F. Corretto, M.D.
California Medical
Association

Michael Hausman, M.D.
Sutter General Hospital

David C. Price, M.D.
University of California,
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Sacramento Municipal
Utility District

Henry Delagio
Southern California
Public Power Authority

Robert Reid
Southern California Edison Co.

ENGINEERING &
SERVICES
William Cromwell

Thomas A. Gray
Thomas A. Gray &
Associates

William A. Larson
TRW Electronics & Defense

AT-LARGE
Deborah B. Sebesta, CNMT
Nuclear Pharmacy, Inc.

Marlene Gregory
Methodist Hospital of
Southern California

Walter Wegst, Ph.D.
University of California,
Los Angeles

INDUSTRIAL
Robert E. Butler
General Electric Co.

Leon G. Cuthbert
Aerojet Ordnance Co.

Harry K. Wellhauser
GA Technologies Inc.

Chairmen Simpson and Domenici, Members of the Subcommittees on Nuclear Regulation and Energy Research and Development,

It is a pleasure to be here today to represent the California Radioactive Materials Management Forum as you address important legislation designed to preserve and expand the nation's system for safely disposing of low-level radioactive wastes.

CAL RAD FORUM: COMPOSITION, OBJECTIVES, ACTIVITIES

The CAL RAD FORUM is a professional association formed in 1982 and composed of educational, research, medical, and industrial organizations that are concerned with the safe management of radioactive materials. The public and private institutional and corporate members of the CAL RAD FORUM include California's five major electric utilities, universities, hospitals, industries, manufacturers of radiopharmaceuticals, and professional societies. These corporate and institutional members use radioactive materials and generate most of the low-level waste in California and in the thirteen western states.

CAL RAD FORUM's primary objectives are the establishment in California of a facility for the safe, reliable, and cost-effective disposal of low-level wastes and maintaining access to the existing disposal facilities on which we now rely until the California facility is in operation. To achieve these goals the FORUM supports legislative programs; facilitates the exchange of information on technical, legislative, and regulatory aspects of low-level waste disposal and management; and carries out a program of public information and education.

PROGRESS IN CALIFORNIA -

In 1983, CAL RAD sponsored California Senate Bill 342, bipartisan, urgency legislation authored by Senator Alfred E. Alquist, Democrat of San Jose and coauthored by then Assemblywoman, now Senator, Marian Bergeson, Republican of Newport Beach. SB 342, which was approved overwhelmingly by both Houses of the California Legislature, committed California to establish a low-level waste disposal facility, established a process for doing so, and directed the Governor to negotiate entry into a compact or other mutually beneficial interstate agreement. SB 342 makes California one of the very few states with independent statutory commitments to establish a low-level waste disposal facility. Pursuant to state law, a survey has been completed to identify regions of the state within which siting criteria are likely to be met. Regulations have been adopted for selecting a developer and for licensing a disposal facility. Several firms are competing for a license to develop the facility on an exclusive basis under state regulation. (California has been an agreement state since 1962.) Also pursuant to the Legislature's instructions in SB 342, Governor Deukmejian has negotiated a compact with Arizona. Although the legislation to ratify the compact (Senate Bill 106) has the same bipartisan authorship as did SB 342, ratification has thus far failed as the state Assembly has politicized the issue by the addition of a rider designed to make sure the disposal facility does not wind up in a Democratic district. On September 30th, Governor Deukmejian wrote each member of the

Legislature urging ratification when the Legislature reconvenes in January, and he observed that, "Ratification of the the compact is not an appropriate vehicle to address the question of where a site will be established." The Governor further commented that "...the site should be chosen based upon geological characteristics, not political boundary lines."

As you may know, selection of a facility developer in California has been delayed for a year by litigation over the selection process. Just last week, our state Administration took a major step and decided to drop an appeal of a lower court decision thus bringing the litigation to an end and allowing developer selection and site selection, licensing and development to move forward.

As the representative of a private association, I cannot, of course, speak for state government. I can tell you, however, that we have been assured by senior officials of the Administration of their complete commitment to the compact process, the compact with Arizona, and the establishment of a disposal facility in California pursuant to SB 342. The Governor's two actions last week in pledging another attempt to secure ratification of the Western Compact and in ending the litigation and resuming the selection process for a facility developer underscore that commitment.

RECOMMENDATIONS FOR AMENDMENTS TO THE LOW-LEVEL WASTE POLICY ACT

Failure of the states to even identify the location of a new disposal site, let alone establish a new facility, since the enactment of the Low-Level Radioactive Waste Policy Act in 1980 now places the Congress in the position of forging a compromise between the nineteen states that are members of sited compacts and the remaining thirty-one that are not. As users of radioactive materials, our members appreciate the skill and effort that many have contributed toward fashioning the compromise legislation now before your committees and committees of the House. Based on what has been accomplished thus far, we are confident that legislation will be enacted this year.

I would like to offer brief comments in five areas which have not yet been resolved: 1) a legislative resolution of the jurisdictional dispute over the regulation of so-called "mixed wastes", 2) non-discrimination among waste generators in applying penalties for missing milestones, 3) adhering to the compact approach established in 1980, 4) putting the pressure on states, rather than users of radioactive materials, for progress toward new disposal facilities, and 5) expeditious review of license applications by the Nuclear Regulatory Commission or agreement states as appropriate.

1) Regulation of "mixed wastes". CAL RAD is a strong supporter of a Congressional resolution to the jurisdictional dispute between the Nuclear Regulatory Commission and the Environmental Protection Agency over the disposal of so-called "mixed wastes". We supported the McCain amendment to H.R. 1083 adopted by the Interior and Insular Affairs Committee. The issue is particulary important to California as it affects the operation of the Hanford disposal facility where the site operator is under state order to obtain a RCRA permit from EPA. To avoid dual jurisdiction and conflicting regulations,

permitting authority should be with the NRC or the state agency performing agreement state regulation.

2) Non-discrimination if access denied. CAL RAD's member organizations reflect the diversity of activities that use radioactive materials and generate low-level waste. Our policy is that waste ought to be regulated and managed for what it is, not its institutional source. All users of radioactive materials that produce low-level waste should be treated equally up to and including denial or suspension of access for failure to meet a milestone.

3) Importance of the compact approach. It has recently been suggested that individual states be allowed to operate new disposal facilities on a restrictive basis in the manner that the 1980 Act and consent to compacts would allow compacts to operate their regional disposal facilities on a restrictive basis. We strongly support maintaining the compact approach of the 1980 Act. To encourage each state to "go-it-alone" will lead to a proliferation of uneconomic, unneeded disposal sites. A national system consisting of a large number of economically shaky facilities would undermine confidence in all disposal facilities even the few large enough to be viable.

4) State governments should at least share the risks of delay. The various bills now before the Congress put all the risk of delay or failure in establishing new disposal facilities on the users of radioactive materials and not on state governments. At best, waste generators will have to pay extraordinarily large surcharges for limited disposal services, and, at worst, we risk loss of access to the existing facilities if progress toward new facilities fails to keep pace with the specified milestones. The theory that radioactive materials users who generate waste can "pressure" their states into timely compliance with federal policy has yet to be proven. User groups are already doing what we can, yet the events of the past year in California show how we are at the mercy of volatile state policies and actions: one year after directing the Governor to obtain a compact, the California Assembly refuses to ratify it except on political terms known to be unacceptable to him and the Senate authors; the manner in which the state implements the selection process for a developer (called a "license designee" under California law) leads to litigation that delays the site development process by more than a year.

CAL RAD would be happy to work with you and your staff to find a mechanism that will keep the pressure on state governments to expedite the development of new disposal facilities. One suggestion is that upon state failure to meet a specified milestone, the state be required to take title to low-level waste upon payment by the waste generator of a one-time fee equivalent to current disposal costs. Expenses for storage and ultimate disposal would then fall upon the state without recourse to any further payment by the user that generated the waste.

5) Expedited review. CAL RAD supports enactment of a provision for expedited review of license applications for low-level waste disposal facilities by the NRC and the agreement states.

I would be happy to try to answer any questions you may have.

CORPORATE AND INSTITUTIONAL MEMBERS OF THE CAL RAD FORUM

Electric Utilities

Pacific Gas & Electric Company
Sacramento Municipal Utility District
San Diego Gas & Electric Company
Southern California Edison Company
Southern California Public Power Authority **

Universities

Loma Linda University
Stanford University
University of California
University of Southern California

Engineering and Nuclear Services Companies

Adco Services
Chem-Nuclear Services, Inc.
Dames & Moore
KLM Engineering
Pacific Nuclear Systems, Inc.
Reactor Experiments, Inc.
SRI International
Thomas Gray & Associates, Inc.
US Ecology, Inc.
Westinghouse Hittman Nuclear, Inc.

Radiopharmaceutical and Biomedical Companies

California Biotechnology
Medi-Physics, Inc.
Nuclear Pharmacy, Inc.
Squibb Diagnostics
Syntex USA, Inc.

Hospitals and Clinics

California College of Podiatric Medicine
Cancer Foundation of Santa Barbara
Cedars-Sinai Medical Center
Community Hospital of Central California
Community Hospital of Monterey Peninsula
Eisenhower Medical Center
Foothill Presbyterian Hospital
Hospital Consortium of San Mateo County
Huntington Memorial Hospital
Lodi Community Hospital
Methodist Hospital of Southern California
Mount Diablo Hospital
Scripps Clinic and Research Foundation
Sutter Community Hospitals
Verdugo Hills Hospital

Industrial Companies

Aerojet Ordnance Company
GA Technologies Inc.
General Electric Company
TRW Electronic & Defense Sector

Professional Societies

American Association of Physicists in Medicine, San Francisco Bay Area
American College of Nuclear Physicians, California Chapter
American Nuclear Society, Southern California Chapter
California Medical Association
California Radiological Society
California Society of Pathologists
Health Physics Society, Southern California Chapter
Northern California Chapter, Society of Nuclear Medicine
Southern California Chapter, Society of Nuclear Medicine

** Members: Cities of Anaheim, Azusa, Banning, Burbank, Colton, Glendale, Los Angeles, Pasadena, Riverside, Vernon; Imperial Irrigation District.

Senator EVANS. Thank you very much, Mr. Pasternak.

Dr. Goldsmith.

STATEMENT OF DR. STANLEY J. GOLDSMITH, M.D., AMERICAN COLLEGE OF NUCLEAR PHYSICIANS/SOCIETY OF NUCLEAR MEDICINE, ACCOMPANIED BY CAPT. WILLIAM H. BRINER (USPHS RET.)

Dr. GOLDSMITH. Thank you.

Mr. Chairman, members of the committee, I am Dr. Stanley J. Goldsmith, a practicing nuclear medicine physician and director of the Department of Physics and Nuclear Medicine at the Mt. Sinai Medical Center in New York City. I am also the president of the Society of Nuclear Medicine.

Appearing with me today is Capt. William H. Briner, who is chairman of the Government Relations Committee of the Society of Nuclear Medicine and an associate professor of radiology at Duke University Medical Center.

We are here today on behalf of both the society and the American College of Nuclear Physicians. We thank you for this opportunity to address this important issue. In the interests of time, I will summarize the written statement submitted by both organizations, whose combined membership of over 11,000 represent the country's nuclear medicine community.

Our primary purpose in appearing before this committee today is to verify the immediacy of this issue to the medical community, to explain the importance of adequate disposal facilities for the continued delivery of health care services in this country, and to comment on the issues raised by Senate bills 1517 and 1578 and other recent proposals to amend the Low-Level Radioactive Waste Policy Act.

There are several points to be emphasized.

First, we urge the committee to clarify the issue of overlapping and conflicting jurisdiction between the Nuclear Regulatory Commission and the Environmental Protection Agency for certain mixed radioactive waste, particularly involving organic solvents. This problem has now reached the point where the major disposal facility in this country receiving scintillation vials from health care facilities will, effective October 28, 1985, no longer take these wastes for disposal.

The question of which agency has primary jurisdiction over these mixed wastes must be clarified. It is simply not feasible—technically, administratively, or economically—to comply with conflicting sets of Federal regulations.

The announced closure of the major disposal facility for scintillation vials is a consequence of this problem and represents an eminent danger to biomedical research in this country.

The nuclear medicine community feels that the NRC, with its historical involvement in the area of low-level waste management, should be the single agency for regulating low-level waste.

We are concerned also about requiring stringent volume reduction schemes on the medical community. If one looks at volume reductions already accomplished by medical institutions, it becomes clear that further reductions are not reasonable. In 1978, for example, 21,300 cubic meters of low-level waste were disposed by medical and academic generators.

In 1983, this had been reduced to less than 5,000 cubic meters, representing less than 6 percent of the total low-level waste generated and disposed of during 1983. This fourfold reduction in volume in 5 years has been accomplished through onsite decay and mechanical compaction. It is highly unlikely that further reductions could be achieved. The college and the society support provisions to exempt small volume generators from mandatory percentage reductions in view of the progress evidenced by the above information.

I want to emphasize the following point, which is not in our written submission. We believe, in addition, that the existing emergency exemption provisions for medically derived waste should be maintained. This is a difficult issue, since we have to date encouraged developing sites to include low-level wastes from all sources. We continue to support the development of such sites. However, we believe it is urgent for the public welfare to assure exempt access to sites for medical generators.

The Governor of the State with a waste disposal site should be permitted, on petition from the Governor of a State which generates the waste, to permit emergency disposal of that waste, even if the site is closed to other wastes. This is essential to assure the continuation of patient care and medical research.

We also urge that federally generated biomedical waste, such as that from the Veterans' Administration facilities, the National Institutes of Health, and federally funded research, be permitted continued access to existing and new sites within the region where the facility is located.

We sincerely believe that failure to develop additional sites and/or any disruption in the availability of existing disposal capacity will have a serious and negative impact on the delivery of health care services and the cost of these services in this country.

The medical applications of radioactive materials, however, are not just a matter of importance to the specialty of nuclear medicine. While it is true that there are an estimated 120 million nuclear medicine procedures performed annually in the United States, these studies represent only one of the important contributions that radioactive materials make to health care.

Perhaps as much as 30 percent of all biomedical research is dependent on radioactive traces. Further, radioactive markers are used in the development of approximately 95 percent of all of the prescription drugs in America.

Critical to your deliberations and decisions is the hidden aspect of medical waste, that produced by the manufacturers of radiopharmaceuticals and radioactive chemicals used in medical research. These materials of somewhat greater activity than hospitals waste would exceed available onsite storage by manufacturers within 1 to 6 months, should there be any closing of offsite low-level waste disposal.

We fear the impact on radiopharmaceutical manufacture in an already unfavorable economic climate that could result from the failure to find a reasonable solution to the waste problem and complete stoppage of all the medical activities already discussed.

Radiopharmaceutical manufacturers should be classified as small generators and should be exempted also from mandatory volume reduction schemes. This would place all producers of biomedical waste—hospitals, medical centers, academic institutions, and radiopharmaceutical suppliers—in one class.

In conclusion, Mr. Chairman, the American College of Nuclear Physicians and the Society of Nuclear Medicine recognize the sensitivity of people in those States which currently have low-level radioactive waste management sites. We support a comprehensive and fair national policy for the development of regional low-level radioactive waste management sites, as envisioned in the Low-Level Radioactive Waste Policy Act under discussion.

It is important that the Congress and these committees act expeditiously, and it is clear from what we have heard today that this committee appreciates the need to reinforce the Low-Level Policy Act of 1980.

From our perspective as physicians and scientists, your action will have a most significant impact on the continued availability of critically important medical services and biomedical research.

We greatly appreciate this opportunity to offer our reviews, and will be pleased to answer any questions.

[The prepared statement of Dr. Goldsmith follows:]

STATEMENT

On Behalf Of The

SOCIETY OF NUCLEAR MEDICINE
and
THE AMERICAN COLLEGE OF NUCLEAR PHYSICIANS

Before The

SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
SUBCOMMITTE ON ENERGY RESEARCH AND DEVELOPMENT

And

SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE
SUBCOMMITTEE ON NUCLEAR REGULATION

Concerning

LOW LEVEL RADIOACTIVE WASTE COMPACTS

Presented By

STANLEY J. GOLDSMITH, M.D.

And

CAPT. WILLIAM H. BRINER (USPHS RET)

October 8, 1985

SUMMARY OF COMMENTS

Testimony on Low-Level Radioactive Waste Compacts

October 8, 1985

- The management of low-level waste is of concern beyond the practice of Nuclear Medicine since the medical uses of radioactive materials is critically important to all of medicine. In addition to the over 120 million Nuclear Medicine procedures performed annually, radioactive markers are used in the development of 95% of all prescription drugs and radioactive tracers in as much as 30% of all biomedical research.
- It is imperative that Congress ratify this session those compacts already submitted.
- 1986 exclusionary authority should be maintained in modified form, although a grace period and development of milestones will be needed to achieve new site development.
- Interstate compact process should contain appropriate surcharges, milestones, incentives and provisions to achieve rapid approval of sites by NRC and agreement states.
- Federally-generated biomedical waste should be permitted continued access to existing and new sites in accordance with the geographic region where the facility is located.
- All biomedical waste generators (hospitals, medical centers, academic institutions and radiopharmaceutical manufacturers should be exempt from mandatory reduction through an allotment system, although surcharges could be used as a positive incentive.
- 1980 is the appropriate year to use as base year for measuring volume reductions.
- The issue of conflicting EPA and NRC authority over mixed waste must be clarified.

Mr. Chairman, Members of the Committee, I am Stanley J. Goldsmith, a practicing Nuclear Medicine Physician at Mt. Sinai Hospital in New York, director of the Department of Physics-Nuclear Medicine and Professor of Clinical Medicine at the Mt. Sinai Medical Center and President of the Society of Nuclear Medicine. Appearing with me today is Capt. William H. Briner who is Chairman of the Government Relations Committee of the Society of Nuclear Medicine (Society). Capt. Briner is an Associate Professor of Radiology and Director of the Radiopharmacy and Nuclear Medicine Laboratory of the Duke University Medical Center. We are here today on behalf of both the Society and the American College of Nuclear Physicians, and we thank you for this opportunity to address this most important issue. In the interest of time, I will summarize the statement for both organizations whose combined membership represent the country's Nuclear Medicine Community.

The Society represents over 10,000 physicists, technologists, chemists, radiopharmacists, and physicians. The Society is dedicated to improved patient care through the advancement of the art and science of Nuclear Medicine and has major interests in scientific, educational, and research activities affecting Nuclear Medicine and low-level waste issues.

The American College of Nuclear Physicians is a professional organization representing 1,200 physicians whose primary activity is the practice of Nuclear Medicine. The members of both organizations have been involved in the formation of compacts and activities which will lead to the siting of disposal facilities as envisioned by the passage of the Low Level Waste Policy Act of 1980.

Our primary purpose in appearing before this Committee today is to verify the immediacy of this issue to the medical community, to explain the importance of adequate disposal facilities for the continued delivery of health care services in this country and to comment on the issues raised by S. 1517 and S. 1578 and other recent proposals to amend the Low-Level Radioactive Waste Policy Act.

Before I discuss the substance of our comments, permit me to express our appreciation and compliment both these Committees for holding these joint hearings. In view of the shared committee jurisdiction and the critical timing pressure we face, it is important that both of these committees move forward, and we are grateful for your efforts.

The message we bring before the Committees today is presented from the perspective of clinicians and other professionals working in the field of Nuclear Medicine. First, we sincerely believe that failure to develop additional sites and/or any disruption in the availability of existing disposal capacity will have a serious and negative impact on the delivery of health care services and the cost of those services in this country. It is essential that Congress and other interested parties understand the clinical applications radioactive materials have in the delivery of health care services and the cost of those services in this country.

The medical applications of radioactive materials are not just a matter of importance to the specialty of Nuclear Medicine. While it is true that there are an estimated 120 million Nuclear Medicine procedures performed annually (Low Level Radioactive Waste Management Handbook Series: An Introduction, August, 1983, U.S. Dept. of Energy (DOE/LLW-13Ta)) in the United States, this represents only one of the important contributions that radioactive materials make to health care. It is not common knowledge that perhaps as much as 30% of all biomedical research is dependent on radioactive tracers. Further, radioactive markers are used in the development of approximately 95% of all the prescription drugs in America. The data submitted to the FDA by drug manufacturers is heavily dependent on the use of such tracers.

Second, we feel it is imperative that Congressional approval be obtained during this session of Congress for those regional compacts already submitted. This should encourage the remaining states to continue their efforts to comply with Congressional intent as set forth in the 1980 Low Level Waste Policy Act. It will also help give credence to the intent of the 1980 Low Level Waste Policy Act and reaffirm the faith of the citizens who worked toward implementation.

Third, it is clear now that new sites will be available by the end of this year. Therefore, it is necessary to provide a grace period so that, under certain conditions, continued access would be allowed to a host state until the operation of a new disposal facility(ies) is on-line. We feel that linked to such an arrangement should be appropriate milestones and provisions to encourage the Nuclear Regulatory Commission and the agreement states to work toward rapid approval of new sites although not at the expense of necessary public health and safety or environmental concerns. These concepts are embodied in the Senate bills introduced thus far.

Fourth, we urge that Federally-generated biomedical waste, such as that from Veterans Administration facilities and from the

National Institutes of Health, which historically have been accepted by existing disposal sites, be permitted continued access to existing and new sites within the geographic regions where the facility is located.

Fifth, we are concerned about requiring stringent volume reduction schemes on the medical community. Although we certainly understand the need for volume reduction, if one looks at volume reductions already accomplished by medical institutions, it becomes clear that, in most cases, further reductions are not reasonable. For example, in 1978, 21,300 cubic meters of low-level waste were disposed by institutional generators (medical plus academic); this represents 25.4% of the total volume of low-level waste generated during that calendar year. In 1983, 4,916 cubic meters of low-level waste were disposed by the medical and academic generators; this represented 5.8% of the total low-level waste generated and disposed during 1983. This represents more than a four-fold reduction in five years. Further, most institutions have already employed mechanical compaction of waste and storage for on-site decay and it is highly unlikely that further reductions could be achieved. The College and Society support provisions to exempt small volume generators (including hospitals, medical centers, academic institutions and radiopharmaceutical manufacturers) from mandatory percentage reductions in view of the progress evidenced by the above information.

Sixth, the College and Society urge the Committee to clarify the issue of overlapping and conflicting jurisdiction between the

Nuclear Regulatory (NRC) and the Environmental Protection Agency (EPA) for certain mixed radioactive waste. This problem has now reached the point where the major facility in the country which takes scintillation vials from health care facilities will, effective October 28, 1985, no longer take these wastes for disposal. This involves the problem of certain waste products (i.e. Solvents) subject to the Resource Conservation and Recovery Act and radioactive waste subject to NRC requirements which became mixed together in some medical procedures. The question of which agency has primary jurisdiction over these mixed-wastes must be clarified. It is simply not technically, administratively, or economically feasible to comply with conflicting sets of federal regulations. The announced closure of the major disposal facility for scintillation vials is a dramatic and serious example of the problem.

The Nuclear Medicine community feels that NRC with its historical involvement in the area of low-level waste management should be the single agency for regulating low-level waste. The Nuclear Medicine community is familiar with these requirements and the associated procedures which in our view have adequately protected the public health and safety.

Now, allow me to elaborate briefly on the value of radioactive materials in the practice of medicine so you may better understand the views we have expressed thus far.

Nuclear Medicine includes three general categories: diagnostic imaging, *in vitro* or laboratory tests, and therapy.

Imaging, often called "scanning", involves the administration of small amounts of radioactively labeled drugs, or radiopharmaceuticals, to patients. Sensitive equipment presents the distribution of these substances as an image, either still or dynamic, which is used to establish the presence or absence of disease. Such methods are used to examine brain, lungs, liver, heart, bones, gall bladder, thyroid gland, blood vessels, and lymphatic system, among others. These procedures are non-invasive, essentially pain-free, and generally deliver much smaller radiation doses to the patient than do comparable X-Ray procedures. They are cost-effective.

Laboratory or *in vitro* (in glass) procedures involve use of minute radioactive chemicals that react with the patient's body fluids without administration of radioactivity to the patient. These irreplaceable tests are used to determine levels of hormones, vitamins, and drugs; to detect the presence of pregnancy; the presence and recurrence of certain cancers; and specific diseases such as hepatitis.

Radioisotope therapy is the administration of larger amounts of radiopharmaceuticals which localize in a particular place in the body for the destruction of diseased tissue. The most common application is the use of radioactive iodine to treat hyperthyroidism (overactivity of the thyroid gland) and thyroid cancer. It is anticipated that new therapy regimens with radiolabelled therapeutic antibodies will become available, opening whole new vistas in the treatment of cancer.

In addition to the excellent analytic results and sensitivity provided by Nuclear Medicine procedures, it should be noted that alternatives to these procedures, where they exist, are usually more invasive, carry a greater risk to the patient, and/or cost substantially more. For example, if a Nuclear Medicine heart function study could not be performed, the alternative would be cardiac catheterization. Including hospitalization (required for cardiac catheterization but not Nuclear Medicine procedures), the total costs would approximate 10 times that of the Nuclear Medicine heart study.

Another example is cancer of the breast, the commonest cancer in women. An unfortunately large percentage of these women already have spread of the cancer to the bones at the time their breast lump is discovered. In many of these women, the early involvement of bone by cancer can only be diagnosed by a Nuclear Medicine study. Nuclear techniques can detect these changes 6-to-18 months before conventional X-Rays. If this Nuclear Medicine imaging procedure were not available, many women could be subjected to disfiguring surgery under the misconception that cure was still possible. The demonstration of tumor spread by the Nuclear Medicine study enables physicians to limit the surgery and to institute prompt alternative means of treatment early to limit the spread of disease.

Other population groups that could be seriously impacted by the reduction of Nuclear Medicine services are the poor and the patients in small rural hospitals. Because of the high cost of alternative diagnostic techniques, such as CT scanning, many of the hospitals that serve these populations do not have alternative diagnostic modalities available. Thus, Nuclear Medicine services are crucial to the effective medical management of their patients. Indeed, the availability of Nuclear Medicine diagnostic services is required for hospital accreditation.

Low-level waste disposal affects all these applications in two ways: first is our direct production of waste, both liquid and solid, including materials used in administering radiopharmaceuticals to patients, contaminated gloves and absorbent materials used in patient care, vials of laboratory reagents, biomedical research and unused or outdated supplies of radiopharmaceuticals. Such materials from hospitals and laboratories account, according to 1983 data (DOE/LLW-39T), for only 3% of the total volume and an even smaller percentage of the total radioactivity. As discussed earlier, much of this material is subject to volume reduction and on-site storage; clinical hospital waste in particular is mostly of short half-life. The hospital community over the last several years has made rapid progress toward on-site decay. It is now a common procedure in hospitals.

Critical to your deliberations and decisions is the "hidden" aspect of medical waste, that produced by the manufacturers of radiopharmaceuticals and radioactive chemicals used in medical research. These materials, of somewhat greater activity, would exceed, according to industry representatives, available on-site storage by manufacturers within one-to-six months should there be any closing of off-site low-level waste disposal sites. We fear the impact on radiopharmaceutical manufacture in an unfavorable economic climate that could result from the failure to find a reasonable solution to the waste problem and complete stoppage of all the medical activities discussed, despite any heroic efforts which might be made if such a situation should arise. Radiopharmaceutical manufacturers should be classified as small generators and should be exempted from mandatory volume reduction schemes. This would place all producers of biomedical waste -- hospitals, medical centers, academic institutions and radiopharmaceuticals -- in one class.

The Society and College have a long-standing involvement in the issue of low-level waste management. The College has established and trained a speakers bureau of over 100 physicians and scientists to inform and educate the general and medical public on the issues we are discussing today, recognizing the prevalence of misconceptions about radioactivity, in general, and waste disposal, in particular, which make such an effort necessary.

In addition to these efforts, many of our members, as I mentioned, have been active on the state scene with compact formation, site selection, and dealing with state legislature. We have become aware of the difficulties already surmounted in shepherding cooperative language through these bodies in the face of provincial jealousies. Many state legislators feel that their states have now done their part in meeting the requirements of enabling legislation. We are most sympathetic with that position. Based on our experience, should the Congress add new language at this time which dramatically alters the compacts and, thereby, forcing a second consideration in the legislatures, we could face a very hostile environment, particularly if it appears that the additions would primarily benefit states which have not previously acted. We realize that you are sensitive to this situation, but we wanted to emphasize our concern.

In conclusion, Mr. Chairman, the College and the Society recognize the sensitivity of the people in those states which currently have low-level radioactive waste management sites. Certainly, the medical community does not suggest that any one or even a few states bear the responsibility for managing all the low-level radioactive waste in this country. We also understand the difficult problems faced by you in the Congress in terms of approving the compacts.

The College and the Society strongly support a comprehensive and fair national policy for the development of regional, low-level radioactive waste management sites as envisioned in the Low Level Radioactive Waste Policy Act. It is important that the Congress and these Committees act expeditiously. From our perspective as physicians and scientists, your actions will have a most significant impact on the continued availability of critically important medical services and the development of new therapeutic and diagnostic services.

The College and the Society offer the expertise in Nuclear Medicine of their memberships to the Committee, in whatever way this may be helpful. We greatly appreciate this opportunity to offer our views and will be pleased to answer any questions.

Senator EVANS. Thank you very much, Dr. Goldsmith.
Mr. Naymark.

STATEMENT OF SHERMAN NAYMARK, CHAIRMAN, QUADREX CORP., CAMPBELL, CA

Mr. NAYMARK. Mr. Chairman, I am Sherman Naymark, chairman and founder of Quadrex Corp. I thank you for your invitation and I am most pleased to be here to testify on the Senate bills now pending before your subcommittee.

I shall summarize the statement which has been submitted in writing to your subcommittee.

Quadrex is a publicly held engineering and technical services company serving the utility industry. We specialize in solving problems of this industry in a number of areas, including providing decontamination equipment and services for radioactive waste.

We also perform services for other industry. For example, we process at our health physics services Gainesville, FL, facility, almost two-thirds of the U.S. liquid scintillation vials, and remove 100 percent of the radioactivity and toxicity of materials that are buried. This allows maximum flexibility for land disposal which right now is being done at the land disposal site in the county where this facility is located.

Quadrex supports the amendments now being considered in the Senate bills. The bills now being considered by your subcommittee not only provide additional time for setting up waste burial facilities, but also impose legal restraints and economic sanctions on the industries generating low-level waste designed to force reduction of the amount of waste that must eventually be buried.

From Quadrex's viewpoint, critical to achieving the objective of reducing the amount of waste to be buried is industry's ability to decontaminate and recycle as clean, previously contaminated material. This decontamination and recycling has two primary benefits. First, the economy of reusing formerly contaminated equipment and material, thus saving both the replacement costs for such items and the burial space that would otherwise be used for such equipment; and second, the reduction in volume of contaminated material that actually is buried and that requires perpetual care.

Using state-of-the-art technology, we have made very significant progress toward realizing these benefits. Our commercial production facility of low-level wastes in Oak Ridge, TN, has been in operation for nearly 3 years, and is regulated by the State of Tennessee under the agreement State program of the NRC. The technology of reducing volume of waste to be buried has been developed by private industry, and it meets the regulatory guidelines.

This facility is achieving a significant reduction in the amount of low-level waste that is being buried. Let me give you some statistics to illustrate the point. And Mr. O'Reilly has a chart that might make it more illustrative.

[Chart displayed.]

In 1984, 2.6 million cubic feet of low-level waste was buried in the three operating burial sites. Slightly over 1 million cubic feet came from nonutility generators. Just over 1.6 million cubic feet came from nuclear utility electric generating plants. About 1 million cubic feet of the material from the nuclear plants was nonmetallic waste, combustibles, resins, wood, plastics, and other materials. About 800,000 cubic feet of the material was metallic.

Quadrex, at its Oak Ridge facility, is involved with this latter 800,000 cubic feet. Incidentally, at the Gainesville facility, and the liquid scintillation vials, had they been buried, they would have been buried in this column here.

In the same year, 1984, the Quadrex facility in Oak Ridge processed about 200,000 cubic feet of radioactive metallic waste from nuclear plants. This 200,000 cubic feet, which is about 25 percent of the total metallic waste generated, would normally have gone to burial and would have added to the contaminated buried metallics. However, over 80 percent of the material that Quadrex decontaminated, about 160,000 cubic feet, was recycled or released as clean scrap for resuse. Less than 20 percent was buried as waste.

To summarize, the Oak Ridge facility reduced burial volume in 1984 by about 160,000 cubic feet. It recycled for reuse to utility clients over 35,000 cubic feet of valuable clean tools, equipment and material, and recycled on the scrap metal market over 1,400 tons of clean scrap steel, aluminum, copper, brass, zincalloy, and other valuable materials for reuse by American industry.

In 1984, the Quadrex facility served 17 utilities located in the Southeast, Midwest, Central Midwest, and Central compact region. We also served utilities in New England and New York. However, I want to emphasize that our facility has a basic capacity of about twice the volume handled last year. Thus, this one facility alone could decrease the low-level burial volume from nuclear utility powerplants overall by over 15 percent, and with respect to metallic waste, by over 30 percent.

Decontamination and recycling facilities like Quadrex's can provide a valuable service to all clients on a national basis. We happen to be located in the Southeast compact region but, as I noted earlier, we decontaminate material received from nuclear powerplants in many regions. It is important to recognize that the importance of rad waste material from any one region does not suffice to allow economic commercial operation.

Therefore, the bills you are now considering should not only allow, but encourage, decontamination facilities to operate on a national basis. Unrestricted flow of waste to and from decontamination facilities, regardless of regional compact boundaries, is a necessary condition to sustain the economic viability of such facilities.

In addition, decontamination facilities need assurance that all wastes processed at a decontamination facility can be buried. One way to accomplish this is to ensure that decontamination and recycling centers are not regarded as generators of waste under any legislation or compact.

Finally, no financial disincentive should be placed on decontamination facilities, like that which we have. Indeed, it is appropriate to protect or establish financial incentives to encourage the environmentally preferred solution of volume reduction before burial. Thus, decontamination and recycling centers should be allowed to dispose of any reduced volume of process waste without impediment.

Of course, the actual utility generator of any waste sent by a decontamination center to a burial site would be clearly identified so that the utility generator could not avoid its allocation amount and surcharge. To assist your consideration of the two bills in light of these concerns, I have attached to my testimony a few suggested revisions to these bills. These revisions would clarify the role of and provide for viable nationally oriented decontamination and recycling facilities.

I urge the subcommittees to adopt these revisions. I appreciate the opportunity to acquaint you with the role of private decontamination and recycling facilities such as that of Quadrex. We believe the continued operation of such facilities is important to achieve the underlying goals of the legislation being considered.

I will respond to any questions that you have. I thank you for this opportunity.

[The prepared statement of Mr. Naymark follows:]

STATEMENT OF

SHERMAN NAYMARK
CHAIRMAN, QUADREX CORPORATION

BEFORE THE COMBINED

NUCLEAR REGULATION SUBCOMMITTEE
OF THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

AND

ENERGY RESEARCH AND DEVELOPMENT SUBCOMMITTEE
OF THE
COMMITTEE ON ENERGY AND NATURAL RESOURCES

ON

S. 1578 AND S. 1517

UNITED STATES SENATE

OCTOBER 8, 1985

MR. CHAIRMAN AND MEMBERS OF THE COMBINED SUBCOMMITTEES:

I am Sherman Naymark, Chairman and Founder of Quadrex Corporation. I thank you for your invitation, and I am most pleased to be here to testify on Senate bills S. 1517 and S. 1578, the Low-Level Radioactive Waste Policy Amendments Acts now pending before your Subcommittees.

Quadrex is a publicly-held engineering and technical services company formed about 16 years ago. We serve primarily the utility industry both in the United States and internationally. We specialize in solving problems of the utility industry in areas such as engineering and technical support, computer-based analysis systems, and decontamination equipment and services.

We also perform services for other industries. For example, we process liquid scintillation vials and remove 100% of the radioactivity and toxicity. This allows maximum flexibility for land disposal.

I am here today to emphasize my belief that American industry can meet the objectives of the bills before Congress--to safely manage low level radioactive waste (LLRW) and decrease the quantity of LLRW that needs to be buried.

The Low Level Radioactive Waste Policy Act of 1980 directs that the various states in which low level waste is being generated must be responsible for setting up facilities to safely and economically bury the waste. The original target date of 1986 for operation of such facilities will not be met. The bills now being considered not only provide additional time for setting up these facilities, but also impose legal restraints and economic sanctions on the industries generating LLRW designed to force reduction of the amount of waste that must eventually be buried.

From Quadrex's viewpoint, critical to achieving the objective of reducing the amount of waste to be buried is industry's ability to decontaminate and recycle as clean previously-contaminated material. This decontamination and recycling has two primary benefits:

- The economy of reusing formerly contaminated equipment and material, thus saving both the replacement costs for such items and the burial space that would otherwise be used for such equipment, and

- The reduction in volume of contaminated material that actually is buried and that requires perpetual care.

By Quadrex's use of state-of-the-art technology, we have already made very significant progress towards realizing these benefits. Our commercial production facility in Oak Ridge, Tennessee has been in operation for nearly three years and is regulated by the State of Tennessee under the Agreement State Program of the Nuclear Regulatory Commission.

The Oak Ridge facility is achieving a significant reduction in the amount of low level radioactive waste that is being buried. Let me give you some statistics to illustrate this point. For convenience, I will use rounded-off figures.

In 1984, 2.6 million cubic feet of low level waste was buried in the three operating burial sites. Slightly under 1 million cubic feet came from non-utility generators. Just over 1.6 million cubic feet came from nuclear utility electric generating plants.

About 1 million cubic feet of the material from nuclear plants was nonmetallic waste--combustibles, resins, wood, plastics and other materials. About 800,000 cubic feet of the material was metallic. Quadrex is involved with this latter 800,000 cubic feet. This is shown in Figure 1, attached.

In that same year, 1984, the Quadrex facility in Oak Ridge processed about 200,000 cubic feet of radioactive metallic waste from nuclear plants. This 200,000 cubic feet (about 25% of the total metallic waste generated) would normally have gone to burial and would have added to the contaminated, buried metallics shown in Column C of Figure 1.

Over 80 percent of the material that Quadrex decontaminated (160,000 cubic feet) was recycled or released as clean scrap for reuse. Less than 20 percent was buried as wastes. Let me state this 80% volume reduction another way. Had our facility not been operating, over 800,000 cubic feet of metallics would have been buried in the United States in 1984, instead of 660,000.

To summarize, our facility:

- Reduced burial volume in 1984 by about 160,000 cubic feet.

- Recycled for reuse to utility clients over 35,000 cubic feet of valuable cleaned tools, equipment, and materials.

- Recycled on the scrap metal market over 1,400 tons of clean scrap steel, aluminum, copper, brass, zircalloy, and other valuable materials for reuse by American industry.

In 1984, the Quadrex facility served 17 utilities located in the Southeast, Midwest, Central Midwest, and Central compact regions. We also served utilities in New England and New York. However, I want to emphasize that our facility has a basic capacity of about twice the volume handled last year. Thus, this one facility alone could decrease the LLRW burial volume from nuclear utility power plants overall by over 15 percent and, with respect to metallic wastes, by over 30 percent.

This capability is totally consistent with the directions taken in the LLRW bills now being considered. As I understand these bills, they would favor:

- Reduction of burial volumes,
- Recycling of cleaned material for reuse, thereby saving valuable metal, and
- Use of decontamination/recycling methods which are cost competitive with current burial costs.

Decontamination and recycling facilities like Quadrex can provide a valuable service to all clients on a national basis. We happen to be located in the Southeast Compact Region but, as I noted earlier, we decontaminate material received from nuclear power plants in many regions. It is important to recognize that the volume of radwaste materials from any one region does not suffice to allow economic commercial operation.

Therefore, the bills you are now considering should not only allow but encourage decontamination facilities to operate on a national basis. Unrestricted flow of LLRW to and from decontamination facilities, regardless of regional compact boundaries, is a necessary condition to sustain the economic viability of such facilities. In addition, decontamination facilities need assurance that all waste processed at a decontamination facility can be buried. One way to accomplish this is to ensure that decontamination and recycling centers are not regarded as "generators" of waste under any legislation or compact.

Finally, no financial disincentive should be placed on decontamination facilities like Quadrex. Indeed, it is appropriate to protect or establish financial incentives to encourage the environmentally-preferred solution of volume reduction before burial. Thus, decontamination and recycling centers should be allowed to dispose of any reduced amount of processed LLRW without impediment. Of course, the actual utility generator of any LLRW sent by a decontamination center to a burial site would be clearly identified so that the utility generator could not avoid its allocation amount or surcharge.

To assist your consideration of S. 1517 and S. 1578 in light of these concerns, I have attached to my testimony a few suggested revisions to these bills. These revisions would clarify the role of, and provide for, viable, nationally-oriented decontamination and recycling facilities. I urge the Subcommittees to adopt these revisions.

I appreciate the opportunity to acquaint you with the role of private decontamination and recycling facilities such as Quadrex. We believe the continued operation of such facilities is important to achieving the underlying goals of the legislation being considered. We support the efforts to clarify the national priorities related to LLRW. We further believe that our industry can help achieve safe and economical reduction of the volume of low level radioactive waste that is buried in the soil of the United States.

Thank you. I would be glad to answer any questions that you may have.

ATTACHMENTS

EFFECT ON BURIAL

1984 RADWASTE

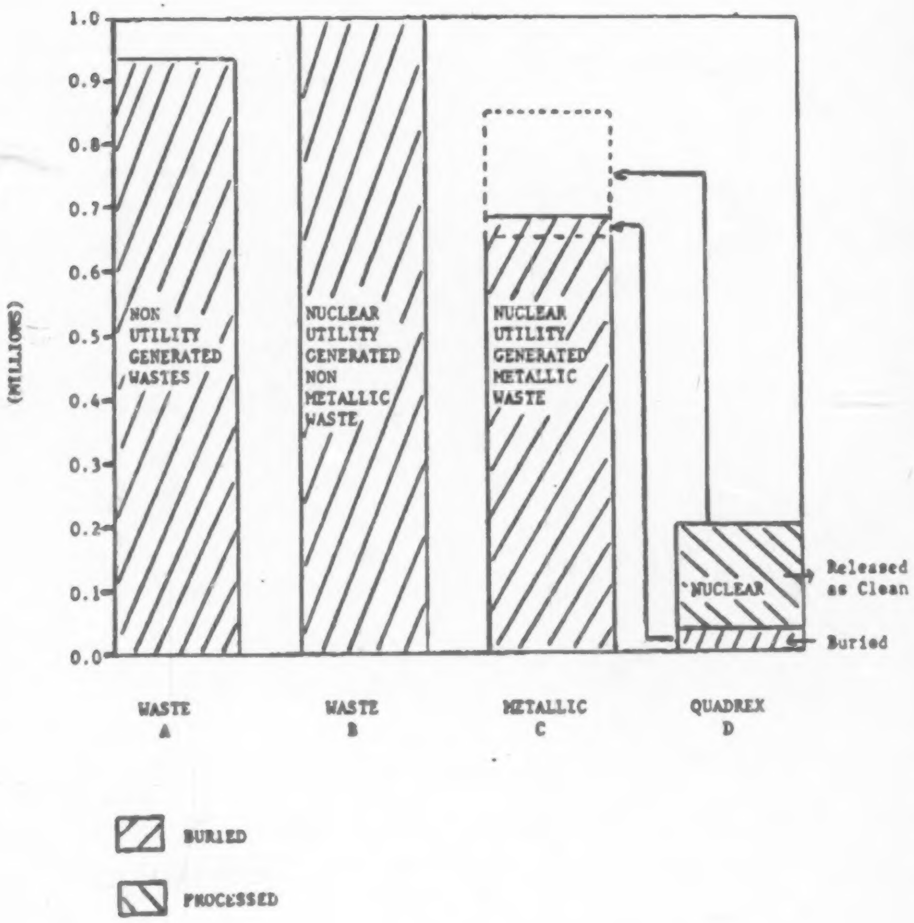

FIGURE 1

ATTACHMENT

SUGGESTED AMENDMENTS TO SECTION 2 OF S. 1578*

1. From page 2, line 6, through page 6, line 8, add the following definitions to Section 2 (at appropriate places with appropriate paragraph numbers):

"( ) The term 'decontamination and recycling facility' means a facility that receives low-level radioactive waste material from a generator, removes the radioactivity, recycles the decontaminated material, and disposes of the radioactive waste. This term does not include facilities that use only a compaction process.

"( ) The term 'recycling' means returning decontaminated material to the generator, selling cleaned material in the scrap metal or other similar markets, or otherwise providing for reuse of the material."

2. On page 8, line 25, add the following sentence at the end of Section 4(a)(1):

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* All references pertain to S. 1578 as introduced on August 1, 1985.

"It is further the policy of the Federal Government that States should encourage the reduction of the amounts of low-level waste generated in the region."

3. On page 11, line 5, after "(2)," delete "and (3)," and insert in lieu thereof ", (3) and (4),"

4. On page 11, line 21, add a new Section 4(c)(4) to read as follows:

"(4) Any authority in a compact to restrict low-level radioactive waste generated within the compact region from being transported to or from the region or from being disposed of inside or outside the region shall not apply either to the transportation of wastes to or from a decontamination and recycling facility or to the disposal of waste by a decontamination and recycling facility."

SUGGESTED AMENDMENTS TO SECTION 2 OF S. 1517*

1. On page 2, line 13, add a new Section 4(a)(3) to read as follows:

   "(3) States should encourage the reduction of the amounts of low-level waste generated in the region."

2. On page 6, line 25, add the following sentence at the end of Section 7(d):

   "Any authority in a compact to restrict low-level radioactive waste generated within the compact region from being transported to or from the region or from being disposed of inside or outside the region shall not apply either to the transportation of wastes to or from a decontamination and recycling facility or to the disposal of waste by a decontamination and recycling facility."

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* All references pertain to S. 1517 as introduced on July 29, 1985.

QUADREX

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Sherman Naymark
Chairman

October 10, 1985

The Honorable Pete V. Domenici
Chairman
Subcommittee on Energy Research and
  Development
Committee on Environment and Public Works
United States Senate
Washington, D.C. 20510

Dear Senator Domenici:

I wish to thank you and your committee associates and staff for the opportunity provided me to present testimony at the joint hearing on October 8, 1985 concerning the proposed Low Level Radioactive Waste Policy Amendments Acts.

I trust the laws enacted by the Congress will not only allow, but encourage, radioactive waste decontamination to be used effectively and economically to reduce LLRW volumes requiring burial.

Quadrex's operating facilities in Oak Ridge, Tennessee, and Gainesville, Florida, are presently:

- Decontaminating over two-thirds of all radioactive scintillation vials generated by the U.S. health services industry.
- Decontaminating about 20 percent of all metallic wastes generated by the nation's nuclear power plants (with present capacity to handle twice this volume).

For this to continue, the federal and regional laws must allow shipment of these wastes on a national basis to decontamination facilities. They must also provide for the lower volume waste stream to be allowed burial at the present three burial sites.

At the hearings, we proposed in our testimony suggested revisions to S. 1517 and S. 1578 to accomplish the above. Please give these proposals your consideration.

Respectfully yours,

Sherman Naymark

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Senator **Evans**. Thank you very much, and thank you to all on this panel.

Let me go back. I have a number of questions, and may skip back and forth, but let me start first with Mr. Berick. Your testimony and that of Mr. Yeager were somewhat similar, as I understood it, in suggesting that we be wary about some of these time limits and how fast we're moving. You heard the testimony of others who suggest quite the opposite; that there is some urgency and some need to arrive at final conclusions.

Mr. Berick, on page 3 of your testimony, you talk about such a system must address the obvious 7- or 8-year leadtime that it will take to put new disposal facilities into operation, and refers to the patchwork of compacts initiated by the 1980 act.

We're talking about really a time period, it seems to me, from 1980 until 1992. Isn't that long enough? More than long enough?

Mr. **Berick**. Well, Senator, you have to divide this really into two parts. One is the process of getting the compact together and deciding which groups of States are going to do that. It was enough to do, I think, in those regions of the country that already had existing sites. But when we're looking at regions of the country like the Northeast and the Midwest, with the experience that they had had with facilities like West Valley, Sheffield, IL, Maxi-Flats, there has been a great reluctance on the part of those folks to go and develop new sites.

We're suggesting in our testimony that looking at where we are today, which is that we have a vast majority of States and compacts. Those compacts with only one or two exceptions, still have yet to pick host States. We have a block of very large generators like New York, Massachusetts, that have yet to fully resolve how they're going to proceed. Starting where we are today, it's going to take us 7 or 8 years to bring new disposal sites on line.

So what we're urging the committee to do is to look at where we are today. Yes, a lot of expectations might have been dashed from where we started out in 1980, but looking where we are today, I think we just have to admit that in some of these regions and some of these States, we have 7 or 8 years to go to get a new facility on line.

Mr. **Yeager**. May I respond to that, Senator?

Senator **Evans**. Well, let me just ask another question, and then certainly I'd be happy to hear further response.

Don't we have to also be concerned about those States? You know you talk about the States that are wary of past problems. I know from personal experience in my own State—in fact, while I was Governor, we had some considerable problems with the way in which low-level wastes were handled at Hanford. Leaking tanks, just disposal in open ditches, a lot of things that were inadequate. There's just as much concern in States which already have sites and which are accepting low-level waste as there in the other States. Why should those States already accepting be any less concerned than the other States? Why not put the same time limits? After all, they're already accepting wastes, and the others are avoiding accepting waste.

Mr. **Berick**. We recognize the concern that those States have, and we have been working with representatives of the Washington

Department of Ecology, for example, on this mixed waste issue because they do have this various problem in terms of the way in which that facility is regulated.

But in terms of where we are with the legislation, one of our criticisms in our testimony for one of the bills before the committee, 1517, is that it doesn't have milestones that will force action. We recognize the concerns of the sited regions to reduce the amount that they are taking, and we are agreeing with the kinds of stipulations that Governor Gardner and the other Governors have tried to put into this system that will set milestones with sanctions, that will force action in those regions.

Senator EVANS. But then you go on in your testimony to say that S. 1578, on the other hand, imposes extreme and draconian sanctions for failing to meet milestones to cut off access to all generators.

What good is it to have milestones unless you have some penalties for failing to meet them?

Mr. BERICK. The question here is whether or not the penalties should be access cutoff for all generators within the region.

Senator EVANS. What other penalties would you suggest?

Mr. BERICK. The penalties we've suggested are the penalties that have been adopted in Governor Gardner's testimony today, which is a combination of a grace period with financial penalties prior to a cutoff, so that if we miss a deadline by 1 month or 1 week, or 3 months, that we aren't going to——

Senator Evans: Or 10 years?

Mr. BERICK. No, not 10 years, because the agreement provides for a cutoff of access. Six months for the first milestone, one year for the second milestone, but we're getting at least some flexibility here, recognizing, for example, the testimony we just heard about California where the decision on who the contractor is is being tied up in court by those people who are vying to be the developer of the site.

So it's not a situation that we can always anticipate as to what is causing the obstruction. It's not simply a State always not wanting to go ahead and develop the facility. What we're asking for is that we recogize there might be a variety of reasons, including losses from contractors such as the California case, that might result in people missing milestones.

What we want is decisions to go ahead. We want the milestones, but we think that there ought to be some flexibility and not automatically cut off access of all generators within a region.

Senator EVANS. Well, you're suggesting cutoff of access after a certain grace period.

Mr. BERICK. Yes.

Senator EVANS. OK. Well, then we've had testimony earlier that the period suggested from now until 1992 is ample, more than ample. Why shouldn't we make those the drop-dead dates and advance the flexiblity time 6 months or a year earlier, and force some action?

My gosh, it only took us 10 years from the time John Kennedy said we'd put a man on the moon to get there, and we can't even seem to handle simple low-level waste. How in the world are we ever going to handle high-level waste?

Mr. **Berick**. My colleague, Brooks Yeager, wants a shot at this. But let me say we are accepting that 1992 cutoff.

Senator **Evans**. With a grace period.

Mr. **Berick**. The 1992 date does not have a grace period.

Senator **Evans**. But the intermediate milestones.

Mr. **Berick**. The intermediate milestones have first a grace period, and then a cutoff.

Senator **Evans**. Mr. Yeager.

Mr. **Yeager**. Senator, if I could respond, I want to first that the Sierra Club endorses the idea of a drop-dead date, and with no grace period thereafter. We also endorse the principle of milestones that are enforceable and that contain incentives for compliance with the schedule.

The difficulty we felt was in the schedule as present in S. 1578 which is the Interior Subcommittee version of the legislation of the House essentially—was that let's take the case of a State that had decided to go it alone or join in a two-State compact, let's say, like Pennsylvania or Illinois, that was well into its siting process; had every intention of having a site on line, had developed a siting plan, was attempting to meet milestones.

What we were afraid of in a schedule with milestones with no grace periods was that you'd have a situation where State regulators would be able to say to a local community or county, if we don't make this decision, whatever decision we're talking about—by let's say the identifying of a site and making a license application—our hospitals are closed, our radiopharmaceutical labs will close; we will lose access.

What we felt the result of that was, more than an incentive to make the date. It was to cause what amounts to a panic in the licensing process. As Governor, you were involved in the State of Washington with the early parts of the high-level waste licensing process. And while we all agree that that's a process that should go forward, I don't think anyone wants to be the subject of having a sort of gun in a regulator's hand at that stage and say, if you don't make this decision now, whether it's ready or not, our hospitals will close.

What we felt was more reasonable was that there would be a grace period of a year; that during that period, the generators in the State or the State itself, if a way could be found, would pay extra fees, so that the incentive would be there but that you wouldn't immediately go to that sort of panic-stricken stage where everyone says, well, even though this is a bad decision, we're going to go ahead and make it right now.

Senator **Evans**. Well, I guess it's all in whether you believe in somebody's deadline or don't believe in the deadline. What if we were to advance the grace period by a year, for instance, and say the warning is now a year earlier and the drop-dead period is the original period. You got your grace period, the warning to say, OK, now, we really mean it. And we haven't delayed anything.

Mr. **Yeager**. I'd say that that depends on your practical analysis of the ability of most, the majority of States to meet each of the suggested milestones. And I think that's really a matter where, to some extent, you have to take States at their word if they estimate a time. I don't think anyone has come in, saying we can't possibly do this process. What people have said is—for instance, the Central States Compact at one point in the House said they thought it would take them until mid-1993 to get a site on line. Well, that was their estimate. I have no basis to challenge that estimate, but that's fully 6 months longer than the time allowed in the bill.

Whether you accept those at face value or not is your judgment. But I think those estimates are out there, and to some extent the House committees dealt with those and established the milestones based on their estimates.

Senator EVANS. That's what we're trying to do, search for the same thing, find out what makes most sense. I guess it comes down to incentives versus penalties versus—I guess we are increasingly in this country getting to the point where we intend to play political chicken. We're doing it right now in the Senate.

They're working over there right now trying to debate whether we can get to a debt-reduction package before we run out of money and quit paying people. I just hope that the ones they pay start alphabetically and I might get paid before those whose name begins with W.

But yes, it is a tough way. I wish there were better ways to do it. Do you suggest that there are—you know, as a different approach to this whole thing, is there a combination of incentives and penalties versus the so-called drop-dead dates that would be even better, or work better?

Mr. YEAGER. As I suggested in my testimony, I think, it is not only that. For instance, I think that the idea of a partial rebate of surcharges is probably a good incentive that will lead to more courageous prompt action on the part of State regulators who would like to get some of that money to pursue their own State siting program.

I also believe that, in addition to penalties and incentives, there is this problem of institutional and practical roadblocks that can be, to some extent, removed by Congress, and that's get the NRC off the dime on alternative methods of disposal. Make them take another look at class C and above waste, which really disturb people and which concern them when they're thinking of siting a short-term disposal site.

Those kinds of things, I think, can smooth the process out a little bit.

Senator EVANS. Do you believe that you have put forward in your testimony all of those other structural or institutional considerations that you'd like to, or would it be helpful to add more?

Mr. YEAGER. All the ones we've collectively thought up are in there.

Senator EVANS. OK.

Ms. Stelluto, you mentioned the effectiveness and the worth of reducing volumes, and the costs:

> We believe that these costly surcharges should serve multiple purposes. We understand they are proposed as incentives to waste volume reduction and disincentives to delay new facility development. However, the radioactive materials users pay the full cost, without penalty to State and regional programs.

With that being the case, do you think there is a problem of surcharges which might get to be so high that they would create some substantial incentive to people to simply dump wastes? We've had that problem on toxic waste and in certain area of the county it's become almost endemic. Is that a potential with radioactive waste?

Ms. **Stelluto**. It's clearly a risk that's out there. I think that most of the people who use radioactive materials have been regulated since they began business, and that is different from the chemical waste stream where it was unregulated for so many years.

In addition to that, radioactivity is so easily detectable that it's unlike that a knowing person would take the risk of dumping indiscriminately.

The greater risk might be to try to skirt the law and release the radioactivity to the environment, either down their drain or through the stack.

Senator **Evans**. Mr. Pasternak, I was fascinated by the politization of this issue, and you suggested in your testimony that there was a rider designed to make sure the disposal facility does not wind up in a Democratic district.

Do you suggest that the corollary of that ought to be that all Democratic generators of waste not be able to dispose of it, then, and only the Republicans can have it disposed of? Is that really a serious—I guess you say an addition of a rider, so I guess it must have been successfully added—is that really a serious kind of consideration?

Mr. **Pasternak**. It's been added in the assembly, and clearly the Senate disagrees, clearly the Governor disagrees. And I cite it as an example of what I believe to be the case; that delay in this whole process usually occurs at the State level. It's going to be due to State governors or State legislators who—and State administrators—who either make mistakes or do not have the political will to move forward to meet the deadlines.

I think—you know, we can argue about what the deadlines ought to be. I think there's a tremendous danger here that the available time is going to be used. I think that was Mr. Blackburn's testimony this morning when he pointed out how his agency in Texas was within days of naming a site, but as soon as State officials in Texas realized that Congress was forging a compromise which would provide for limited access, at that time it looked like 6 or 7 years, they were immediately told to desist, to go back and review their earlier studies, and their program was set back by 3 or 4 years.

And I think the advantage of the compromise legislation that's before you now is that it doesn't wait till the end of the process. It sets periodic milestones that have to be met. And second, the legislation, as I understand it, will be self-executing. It doesn't require yet another act of Congress such as the 1980 act did, which required Congress to grant consent to compacts before the restrictive provisions could take place.

Once a version of the compromise legislation, whether the House version or the Senate version, is enacted, as I understand it, it would be set in place and no further action is going to be needed. And I think this is the kind of pressure that has to be brought to bear on State governments.

The other case that I cited, the litigation over the selection of developer was not the fault of the developer; simply that the State made an error. And the developer that brought suit had no other choice but to bring that suit. So I think that clearly the problem lies with the States. I don't think—in most cases, I don't think it is going to lie with the compact boards. I don't think it's going to lie with the generators who are doing what they can to keep the process moving.

It was the State government who was made responsible in the 1980 act and in most cases I think facilities are going to be brought into being in States that are agreement States, where the regulatory authority will be again in the hands of State government, and that's where the problem lies.

Senator Domenici mentioned the "not in my backyard" syndrome. State political leaders, whether they be legislative or Governors, are facing that problem, and they have to be given the tools to deal with it. I think the milestones clearly are those tools.

In California, we've had on the books for 10 years siting legislation for powerplants that sets time lines for regulatory considerations in applications to build powerplant. If you can do it for powerplants, I don't know why you can't do it with much simpler and smaller kinds of projects that we're talking about here to dispose of low-level waste.

Senator **Evans**. It seems to me that a corollary to Murphy's Law is that government will take whatever time is allowed and fill it all up. So however long we extend it, they'll fill it up, up to a certain point, which I guess we have to find. However short we'll make it, they'll meet, if in fact we have had made that time at least a practical enough length of time.

Mr. **Pasternak**. If in fact it's clear what the impacts to society are and that everyone is in the same boat, there's not going to be preferential treatment. It's going to affect society across the board. And clearly the use of radioactive materials, so widespread in their use, are in that category.

Senator **Evans**. Dr. Goldsmith, I've got one very specific question. I think it may be a typo or something left out of your statement on page 3, where you say it is clear that new sites will be available by the end of the year.

Dr. **Goldsmith**. No new sites.

Senator **Evans**. No new sites. We'll make sure that correction is in the testimony.

Dr. **Goldsmith**. Thank you.

Senator, I might say the exception that you cited was Parkinson's Law. Murphy's Law means everything which goes wrong will.

Senator **Evans**. Well, that's why I said Murphy's Law, because I was applying it to government. I'm aware of Parkinson, but I was being a little harsher, I guess.

On page 4 and 5, you mention that the legislation must clarify the situation of mixed wastes, but you don't get into detail in saying how. Do you have any more particular suggestions as to how we might resolve that particular question?

Dr. **Goldsmith**. We didn't want to substitute for expert opinion. I think, as had been offered earlier this afternoon, either set of legislation or regulations appears to be adequate. The problem is the conflict, and we think it can be handled by inclusion in an act defining priority.

Senator EVANS. From your experience, do you have any feeling—maybe this is an unfair question—any feeling as to which agency, EPA or NRC, seems to have the most straightforward and best guidelines and capacity to deal with these things?

Dr. GOLDSMITH. Included in our testimony was a reference to the fact that we thought the Nuclear Regulatory Agency was best suited to handle the radioactive material question and to handle the low-level radioactive waste, and the medical community has a long history of working with Nuclear Regulatory Commission guidelines and regulations.

Now, we think perhaps some definition can be made in terms of separation. We're not offering expert testimony on that. But we are anxious to see it clearly defined.

Senator EVANS. You also mentioned that biomedical generators ought to be exempted from some of the volume reduction proposals. Would that lead us to a potential problem where, if we specifically pick out biomedical and exempt them, that there are others who have engaged in the same sort of volume reduction, who would then be unfairly treated, or wouldn't be exempted?

Is biomedical such a unique case in terms of volume reduction that others might not apply under the same circumstances?

Dr. GOLDSMITH. I suppose that that potential exists and I don't know what state the evidence exists. We demonstrated from that which is available already through these low-level waste collection sites, a fourfold reduction from the biomedical community in a short period of time, simply with the pressure of difficulty of disposal and cost.

Senator EVANS. What led the biomedical community to really engage in that kind of reduction of volume? Was it the costs primarily? Was there any one factor that was primarily responsible for that push?

Dr. GOLDSMITH. I think the closure of access to sites in 1979 and the attendant cost.

Senator EVANS. Wouldn't that have led other generators of waste to try to do the same thing?

Dr. GOLDSMITH. I can't speak for other generators.

Senator EVANS. I guess that's the problem I've got. I am attracted to your suggestion that if in fact that much has already been done, then a penalty, if you will, based on volume may be inappropriate. But I don't—at least yet—don't have enough information to know whether that's true for just biomedical, or whether it's true more across the board.

Ms. Stelluto, I see that you have a comment.

Ms. STELLUTO. It appears to be true across the board, at least in Massachusetts, that a variety of users have reduced the amount of waste considerably. New England Nuclear, which is the radiopharmaceutical supplier to most of the medical use, has seen a severalfold reduction in waste due to management, and that was again the impetus of the 1979 closures coupled with the increasing costs. So they had that economic incentive to have less waste.

Senator EVANS. Is any of that reduction in volume of waste—has any of that come about because there is reduction in use or production of those radioactive materials?

Dr. GOLDSMITH. No; not in a reduction of use.

Senator **Evans**. So the total use is either level or growing, and so the reduction really does come from some kind of better management or consolidation?

Dr. **Goldsmith**. Yes.

Senator **Evans**. That leads to Mr. Naymark. You had some very interesting testimony on consolidation and actual cleanup, apparently cleanup to the extent that the low-level radioactivity can be eliminated, and tools and other items returned to safe use.

How widespread—well, I should't get into the details of how you do it—but is that process only applicable to metallic materials? Is it something that's more widespread? Could it be used in a way to help in other forms of low-level waste?

Mr. **Naymark**. Right now, the production facilities are set at Oak Ridge on metallics. However, in processing metallics by chemical means and removing the surface contamination chemically, you are left with an aqueous solution. And we cannot vary the radioactivity in aqueous solution; we have to solidify it.

So we've come up with methods of precipitating a solid out of the liquids in order to process, to get ready to handle our own waste. That process itself is equally applicable to anybody else sending in liquids from an operating plant that has radioactivity in it. We have not yet started, we have not introduced that into the commercial field, but I see no reason why at the proper time we cannot.

Senator **Evans**. So do I understand that you start, for instance, with a tool or—well, pick a tool—of a certain volume that is radioactively contaminated? You can chemically clean and take the surface radioactivity off of that into an aqueous solution and then precipitate, and presumably the end result of that that is radioactive is a very small percentage of the original volume of the tool itself, which might have to otherwise be handled in a radioactive site?

Is that essentially the process?

Mr. **Naymark**. That is correct. Just using a rather—I put this together on the plane coming here—if this is a pipe or a tool that has become contaminated, let's say, on the outside with low-level radioactivity, there are three ways you can handle it. You can bury the whole thing in the ground, or you can compact it and vary a lesser volume, or you can remove the radioactivity, return this as clean, and bury that.

That's what I'm talking about.

Senator **Evans**. And it's not even burying that so much. It's putting that into solution and then precipitating and taking just the precise radioactive——

Mr. **Naymark**. That is one method. We also use mechanical devices for getting this off. And therefore you are left, say, with a grit which is a solid plus the radioactivity in it.

Senator **Evans**. Now, how useful is that in all of these many other—take all the biochemical waste. I have the impression at least that biochemical waste—and Dr. Goldsmith may be able to help me—that biochemical wastes tend to be a whole lot of small contaminated—everything from gloves to vials and all sorts of small things which, under any circumstances, even if they'd been cleaned, are not likely to be reused.

Is that essentially the nature of the waste?

Dr. **Goldsmith**. Yes.

Senator **Evans**. What can you do to that to really reduce volume, other than by compacting?

Mr. **Naymark**. It's difficult for me to respond to a question of that general nature. But about 2 years ago, the brokers who handle the liquid scintillation vial, and normally get them from the generators and take them to the land—I mean to the burial people—came to us with a problem. And it didn't take us very long to come up with the device we now use, in which a very large—more than a majority of all the vials are now handled.

And it doesn't require burial because the crushed glass is absolutely clean of radioactivity; you can go to a normal landfill. And the solution with the radioactivity in it has low enough activity so it can go to a burning facility and be burned there under EPA requirements.

So by the use of processing that was in accordance with the laws of the various agencies, we were able to come up with the solution. Whether we can come up with others, I don't know until we know what some of the problems are and have the ability to take a look at them and decide whether we can be of assistance.

Senator **Evans**. Maybe some place in the act we're contemplating, there's a place for incentives of some kind that would drive people to greater consideration of those kinds of alternatives.

Mr. **Naymark**. Those are the things that normally drive people.

Senator **Evans**. OK; we thank all of you very much for being very patient to wait all day. And your testimony will be very helpful to us.

[Whereupon, at 4:35 p.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
EXTERNAL AFFAIRS

NOV 7 1985

Honorable Pete V. Domenici
Chairman
Subcommittee on Energy Research and Development
Committee on Energy and Natural Resources
U.S. Senate
Washington, D.C. 20510

Dear Mr. Chairman:

This is in response to your October 16, 1985 letter requesting our response to your questions and those of Senator Ford arising out of our October 8, 1985 testimony before the Subcommittee concerning legislation which would amend the Low-Level Radioactive Waste Policy Act of 1980.

Our responses are attached. We are not yet able to provide a response to your questions 2 and 5, but will do so as soon as possible.

If I can be of further assistance, please let me know.

Sincerely,

Jennifer Joy Manson
Assistant Administrator for
External Affairs

RESPONSES TO QUESTIONS
FROM
SENATOR DOMENICI
AS FOLLOW-UP
OCTOBER 8, 1985 HEARING
LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

Question 1. If EPA were to Cleahup a Superfund site during the next seven years, and found that some of the wastes contained low-level radioactive materials, how would these wastes be disposed of?

Answer: Under the Low-level Radioactive Waste Policy Act of 1980, States are required to provide, by January 1986, a facility within the State for disposing of low-level radioactive wastes or to enter into a compact with other States that have the appropriate facilities. Therefore, if EPA were to find low-level radioactive materials at a Superfund site, EPA would work with the appropriate State to have the materials disposed of at the designated State facility. If the State did not have a facility or a compact, EPA would work with the State to provide temporary storage of the materials until the State could provide a permanent disposal facility or entered into a compact with another State.

Question 2. How would resolution of the mixed waste issue between EPA and NRC apply to agreement States?

Answer: We are preparing a response to this question and will provide it to the Committee as soon as possible.

Q3. Please elaborate on the difference between NRC regulations for "de minimis" waste and EPA standards for "de minimis" waste.

A3. The Environmental Protection Agency's (EPA) Atomic Energy Act authority, as conveyed by Reorganization Plan Number 3 of 1970, provides that the Agency establish generally applicable environmental standards for the protection of the general environment from radioactive material. Such standards are to include limits on radiation exposures or levels, or concentrations or quantities of radioactive material in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material.

Pursuant to this authority the Environmental Protection Agency is developing Standards for the disposal of low-level radioactive waste. As a part of that effort we intend to promulgate criteria for wastes that are below regulatory concern (BRC). These criteria would define radiation exposures related to disposal of low-level wastes with quantities of radioactive contaminants that are so small that either they do not have to be regulated for their radiation

A3. Continued

hazard, or the wastes can be disposed of with only minimal controls. The BRC criteria which the EPA promulgates will be generic in their application to low-level waste disposal, i.e., it will not prescribe specific wastes, sites, or methods of determination.

It would be expected that the Nuclear Regulatory Commission would prepare regulations that would prescribe the implementation of such criteria in the licensing and enforcement processes for which they are responsible. These regulations could be very prescriptive and specific relative to wastes, sites, and methods.

In developing standards for low-level waste EPA will evaluate existing NRC regulations for potential overlap and duplication.

Q4. Will EPA's schedule for promulgation of a low-level radioactive waste standard be timely with respect to a State's decision on disposal technology?

A4. According to current NRC, DOE and Congressional estimates, development of any new regional or State facilities will probably take upwards of five years. Given this likelihood, the Agency's schedule for promulgating the Low-Level Radioactive Waste Standards will be timely with respect to any State's or Compact's decision concerning selection of disposal technology. Our standard will be a generally applicable environmental standard for land disposal of low-level radioactive waste at any site in the continental United States. In developing our standards, we are evaluating ten disposal methods, including two disposal methods requested by the States (the earth-mounded concrete bunker and the concrete canister methods). We expect to complete our risk assessments and cost benefit analyses and issue proposed Low-Level Radioactive Waste Standards in mid 1986. We believe this will be well within the time needed by the States.

Question 5.	What is it about the current RCRA law that prohibits EPA from reaching an agreement with NRC regarding mixed waste at low-level waste sites.
Answer:	We are preparing our response to this question and will provide it to the Committee as soon as possible.

RESPONSES TO QUESTIONS
FROM
SENATOR FORD
AS FOLLOW-UP
OCTOBER 8, 1985 HEARING
LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

RESPONSES TO QUESTIONS FROM SENATOR FORD

October 8, 1985 Hearing

Q1. Waste Categories. Please enumerate and describe in a comprehensive way the kinds of low-level radioactive waste in existence and identify the regulatory authority or authorities that are responsible for each kind. How much of each kind of waste is produced each year - as a percentage of the total volume of waste and as a percentage of the total activity of waste? How long-lived is each kind of waste typically? Where and how are each of these kinds of waste disposed of? Examples of the kinds of waste we are interested in include but are not limited to classes A, B, and C low-level waste, scintillation vials, accelerator-derived waste, uranium dust from the Fernald, Ohio, uranium feed plant, waste from naval shipyards, and waste from the weapons program.

A1. Regulation of Low-Level Radioactive Wastes: Low-level waste includes basically all radioactive wastes except those that are specifically defined as another class of radioactive wastes. These other classes of radioactive waste include:

(1) Spent nuclear fuel, high-level and transuranic radioactive wastes as defined by EPA in 40 CFR 191.

A1. Continued

(2) Uranium and thorium byproduct materials (mill tailings) as defined by Congress in the Uranium Mill Tailings Radiation Control Act of 1978 (Public Law 95-604)

For regulatory purposes, low-level wastes (LLW) fall under the purview of either the Atomic Energy Act (AEA) or the Resource Conservation and Recovery Act (RCRA). For all practical purposes, most LLW is controlled under the AEA. Wastes that could potentially be controlled under the RCRA include a few manmade radionuclides and naturally-occurring radionuclides.

Characterization of Low-Level Waste

Low-level radioactive waste may be broken down into three groups:

(1) Department of Energy/Department of Defense Wastes ("DOE/defense wastes")

(2) Commercial LLW from NRC Licensees

(3) NARM Wastes ("Naturally-occurring and Accelerator-produced Radioactive Materials")

A1. Continued

The Department of Energy and the Nuclear Regulatory Commission have published numerous detailed reports that characterize LLW. EPA has developed a data base on NARM wastes. The Department of Energy has developed information on the total volume of LLW disposed, as shown in Figure 1. Table 1 identifies these disposal sites more fully. As shown, commercial LLW disposal sites account for about one-third of all LLW disposed of through 1982. The larger contribution of DOE/defense wastes is due to the longer history of operation. In the coming years, commercial wastes will contribute larger annual waste volumes such that by 2004, DOE/defense wastes and commercial wastes will each total about 4.1 million cubic meters. By 2020, the total LLW volume disposed will be about 13.4 million cubic meters, of which 58% may be attributed to commercial LLW generators.

In terms of gross radioactivity, DOE/defense programs will add about 1.4 million curies annually to the total LLW inventory. Commercial waste generators will add a smaller annual amount, however, ranging from half a million curies in 1985 to a little over one million curies in the year 2020. Because of its longer operational history,

A1. Continued

DOE/defense wastes account for about 70% of the total LLW inventory of radioactivity. With the expected contributions from commercial LLW generators, DOE's share will fall to 60% in the year 2000 and 54% in 2020. Inventories for total gross radioactivity in LLW range from about 15 million curies in 1985 to about 25 million curies in the year 2000 and about 34 million curies in 2020.

DOE/defense has characterized its LLW forms, shown in Tables 2 and 3. DOE breaks LLW into six categories. The "uranium/thorium" and "alpha" categories contain long-lived radionuclides. Uranium/thorium wastes contain U-238 with a half-life of over 4 billion years. Alpha waste contains predominantly Pu-241, which decays with a half-life of about 14 years to Am-241, whose half-life is about 430 years. The other categories of DOE waste contain isotopes dominated by "short" half-life (less than one year) or intermediate half-lives (from 12 to 30 years). "Induced activity" waste contains primarily Mn-54 and Co-58, both with half-lives of less than one year. Fission product wastes are of concern because of the larger fractions of Cs-137 and Sr-90, both with half-lives of about 30 years. The "Other" LLW category contains

A1. Continued

significant amounts of Co-60, Cs-134, and Cs-137 with half-lives of 5,2, and 30 years respectively. Tritium has a half-life of about 12 years. Currently, all DOE waste is disposed of by near-surface land disposal at the disposal sites shown in Figure 1 (except for Weldon Springs Quarry, which is inactive).

EPA has characterized commercial LLW to support risk and cost benefit analyses of LLW disposal. Figure 2 illustrates a qualitative breakdown of commercial LLW by volume and activity for the major categories of waste generators. Fuel cycle wastes include those from nuclear power reactors and associated nuclear fuel supply facilities. Institutional waste generators include hospitals, research facilities (medical and nonmedical), clinics, and academic institutions. Industrial waste generators include a wide variety of private concerns involved in manufacturing, research and development, nondestructive testing, mining, and radiopharmaceutical manufacturers. The Government category includes wastes from State and Federal agencies. This includes Government installations (military and nonmilitary) that ship LLW to commercial disposal sites. By far, the largest number of waste generators fall in the industrial and institutional category, with over 18,000 licensees.

A1. Continued

Thus, it is not surprising that LLW may be generated in a large number of waste forms. Table 4 shows a breakdown of commercial LLW into 35 separate wastes, or waste streams. Four major categories of wastes are indicated. Table 5 provides information as to the physical and chemical characteristics of these waste streams while representative waste generation rates are indicated in Table 6. Generalized radionuclide composition of these categories of waste are provided by Table 7. In terms of volume, trash is the largest general type of waste produced but typically has low concentrations of radioactivity. Radionuclide composition of power reactor waste streams contains fission products and activation products plus tiny amounts of long-lived radionuclides (e.g., C-14 and transuranics).

Industrial wastes are quite varied. Depending on the industrial activity in question, wastes may contain tritium and C-14, or fission products, or uranium isotopes. Institutional wastes contain tritium, C-14, and numerous short-lived radionuclides with half-lives typically in the range of hours to days (e.g., Xe-133, I-125, P-32).

A1. Continued

In addition to commercial LLW regulated under the AEA, described above, EPA has characterized an additional category of LLW designated NARM (natural and accelerator-produced radioactive materials). These wastes would be eligible for regulation under the Resource Conservation and Recovery Act (RCRA). Due to their radioactivity content and physical/chemical characteriztics, NARM wastes are most appropriately disposed of at commercial LLW disposal sites. NARM wastes are principally small volume, high activity radium sources. Such wastes include radium needles used for medical purposes, radium used to illuminate watches or dials, and radium caught on ion exchangers used to purify water supplies high in radium content. Volumes of these wastes are extremely small, ranging from less than one cubic meter a year for radium needles to a few hundred cubic meters per year from radium-contaminated ion exchange resins.

Q2. Describe the applicability of EPA and NRC regulatory authority to hazardous radioactive waste. What is proposed by the Administration to address this overlap? What would you propose to resolve any difficulties? What other options are there? Please be specific as to any changes in statutory language you recommend.

A.2 The Environmental Protection Agency (EPA) has two types of authority concerning mixed hazardous radioactive wastes. The first authority, given under the Atomic Energy Act (AEA), is discussed in more detail in our response to Senator Dominici's Question 3; this allows us to establish generally applicable environmental standards for releases of radioactive contaminants from radioactive waste disposal facilities. We cannot prescribe how to conduct operations inside the fence of a radioactive waste disposal facility; that authority rests with NRC or DOE.

On the other hand, the Agency has the sole authority under the Resource Conservation and Recovery Act (RCRA) for regulating the non-radioactive hazardous portion of mixed wastes; this includes authority from the generator through shipment through prescriptive regulations as to how disposal is carried out inside and outside the disposal facility.

A2. Continued

Besides wastes under the purview of the Atomic Energy Act, the Agency has identified another class of low-level radioactive waste to which it plans to extend the coverage of the Low-Level Waste Standards using the Resource Conservation and Recovery Act of 1976. These are the so-called NARM wastes or Naturally Occurring and Accelerator-produced Radioactive Materials. Typical NARM-type radioactive wastes which would be regulated under RCRA are those radioactive wastes not regulated under 40 CFR 191, 40 CFR 192, or 40 CFR 193, such as accelerator-produced radionuclides and naturally-occuring radionuclides, i.e., cobalt-57 and radium.

The NRC's authority over mixed hazardous radioactive waste extends only to AEA licensed radioactive products and materials and extends from the generator through the shipper through complete disposal operations.

Our recommendations for legislative changes to resolve dual regulation difficulties will be included in our response to Senator Domenici's Question No. 5.

Q3 What is "above Class C" radioactive waste?

What volume of waste is involved? What activity?

Who currently has responsibility for "above Class C" radioactive waste that is not spent fuel or high-level radioactive waste? How does S. 1578 treat this type of waste?

What are the principal options for dealing with this waste? Why shouldn't this waste be the responsibility of the Department of Energy for disposal?

A3. Class C radioactive waste is a category of low-level waste (LLW) defined by the Nuclear Regulatory Commission (NRC) in their rulemaking on licensing requirements for LLW disposal (10 CFR Part 61). Thus, Class C wastes are defined with reference to commercially generated LLW. In general Class C wastes contain the largest radionuclide concentrations acceptable for near-surface disposal methods. Wastes containing even larger concentrations would be "above Class C" radioactive waste and would require a greater degree of confinement or protection than provided by available near-surface disposal methods.

A3. Continued

The NRC currently has the responsibility for "above Class C" radioactive waste. If this waste form is received by a disposal site operator, the licensee must safely store the waste until a determination of final disposition is made by NRC.

The volume of "above Class C" waste is expected to be very small. Only about 1% of all LLW is Class C waste. The volume of "above Class C" waste is anticipated to be an even smaller percentage of all LLW. It is difficult to project the exact waste forms that would qualify as "above Class C" waste. Considering the kinds of waste that qualify as Class C waste, possible candidates for the "above Class C" category might include certain ion exchange resins, sealed sources, and isotope production wastes. In the future, a few cubic meters of activated metal from each decommissioned power reactor might also qualify as "above Class C" waste. The responsibility for disposal of the waste should not be decided until a study of the types of waste, disposal/containment methods, and other matters is completed.

Q4 What is the physically available capacity at the existing commercial low-level waste disposal sites, by site? What is the magnitude of this available capacity in relation to the volumes being produced now?

How long could existing low-level waste sites accomodate low-level waste generated in the United States.?

Are there any technical, safety, or economic reasons why generators should adopt volume reduction technologies? What are they? What are the tradeoffs? Are there technical, safety, or economic drawbacks to volume reduction? What are they?

A4. We do not have current information on the available disposal capacity at the existing low-level radioactive waste disposal sites, nor do we know how long these sites could accommodate the low-level radioactive waste generated in the United States. The Nuclear Regulatory Commission or the responsible State licensing authorities should have this information.

There are many trade offs that must be considered relative to volume reduction but these must be evaluated on a site specific basis, no generic evaluation is possible. Some of the potential trade offs are:

A4. Continued

- For the same size site, volume reduction would allow more waste, and consequently, more activity, to go in to the site, possibly increasing the site's potential risk.

- Conversely, volume reduction could eventually reduce the number of sites needed over time, and this could reduce the overall risk.

- The costs of volume reduction need to be weighed against the costs of larger sites.

- In general, volume reduction will create a more stable waste and potentially offset future site maintenance costs.

Q5. Costs

What is the actual cost (including transportation) on a per cubic foot basis of low-level waste disposal under current NRC regulations?

What non-cost charges are currently applied to low-level waste disposal by each of the States with existing sites? What is the relation of these costs to the surcharges proposed under S. 1578? How much does each sited State take in from low-level waste charges? What do these States do with the revenue they generate from low-level waste charges?

A5. We do not have current information on actual and non-cost charges for the disposal of low-level radioactive waste at the existing sites. We are developing generic engineering cost data on low-level radioactive waste disposal methods, but our studies and reports are not yet complete. We would not expect our data to be reflective of specific sites in any case. The responsible State licensing authorities should have this information.

Q6. Milestones

How many States have indicated that they can meet the milestones in S. 1578? What States cannot? Why not?

What will happen in these States if milestones are not met? Be as specific as possible.

A6. We have no current information on how many States have indicated their ability to meet the milestones in S.1578, nor do we know what will happen if these States do not meet the milestones. The Nuclear Regulatory Commission, Department of Energy or the States should have any information available on this matter.

Q7. Enforcement of Milestones

Under S. 1578, when a milestone is missed, the generators in that state lose access to the existing disposal sites. Yet the failure to meet the milestone is really the fault of the politicians and bureaucrats in the State who, presumably have not complied with Federal law.

Why shouldn't the penalty for missing a milestone be borne by the ones who failed to meet it, rather than by the generators who are not in control of the siting process?

Please comment on the following options for dealing with situations where milestones are missed:

Vest title to waste generated after missing the milestone in the Governor of the State that missed the milestone.

Require the State missing the milestone to pay surcharges for continued access for its generators.

Allow generators to sue the Governor of the State that misses a milestone for damages from lost access.

What other options would you recommend the Committee consider to enforce the milestones?

A7. This is beyond the area of the Agency's responsibility.

Q8 Go-It-Alone Status

Should the legislation reported by the Committee include provision for States that want to provide for their own low-level waste disposal, but for no one else's? Why or why not? What should the provision say?

A8. We do not know of any technological reason why a State with sufficient technical expertise to properly site, establish, operate and maintain long-term care for a low-level radioactive waste disposal facility should be prevented from doing so. However, we would note that carried to its extreme, it would lead to a proliferation of 50 sites throughout the United States.

Q9. Low-Level Waste Definition

Please provide the Committee with a suitable legal definition of low-level waste for the purposes of the amendments to the Low-Level Waste Policy Act under consideration in the Committee.

A9. EPA recommends that the following definition for low-level radioactive waste contained in Public Law 97-425, "The Nuclear Waste Policy Act of 1982," be used:

> "The term 'low-level radioactive waste' means radioactive material that--
>
> (A) is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or by-product material as defined in section 11(e)(2) of the Atomic Energy Act of 1954 (52 USC 2014(e)(2); and
>
> (B) the (Nuclear Regulatory) Commission, consistent with existing law, classifies as low-level radioactive waste."

(For EPA's own regulations, our definition includes radioactive wastes which could be covered under the Resource Conservation and Recovery Act of 1976.)

6560-28 8/15/1985

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 191

ENVIRONMENTAL STANDARDS FOR THE MANAGEMENT AND DISPOSAL OF SPENT NUCLEAR FUEL, HIGH-LEVEL AND TRANSURANIC RADIOACTIVE WASTES

AGENCY: Environmental Protection Agency

ACTION: Final Rule

SUMMARY: The Environmental Protection Agency (EPA) is promulgating generally applicable environmental standards for the management and disposal of spent nuclear fuel and high-level and transuranic radioactive wastes. The standards apply to management and disposal of such materials generated by activities regulated by the Nuclear Regulatory Commission (NRC) and to disposal of similar materials generated by atomic energy defense activities under the jurisdiction of the Department of Energy (DOE). These standards have been developed pursuant to the Agency's authorities and responsibilities under the Atomic Energy Act of 1954, as amended; Reorganization Plan No. 3 of 1970; and the Nuclear Waste Policy Act of 1982.

Subpart A of these standards limits the radiation exposure of members of the public from the management and storage of spent fuel or high-level or transuranic wastes prior to disposal at waste management and disposal facilities regulated by the NRC. Subpart A also limits the radiation

exposures to members of the public from waste emplacement and storage operations at DOE disposal facilities that are not regulated by the NRC.

Subpart B establishes several different types of requirements for disposal of these materials. The primary standards for disposal are long-term containment requirements that limit projected releases of radioactivity to the accessible environment for 10,000 years after disposal. These release limits should insure that risks to future generations from disposal of these wastes will be no greater than the risks that would have existed if the uranium ore used to create the wastes had not been mined to begin with. A set of six qualitative assurance requirements is an equally important element of Subpart B designed to provide adequate confidence that the containment requirements will be met. The third set of requirements are limitations on exposures to individual members of the public for 1,000 years after disposal. Finally, a set of ground water protection requirements limits radionuclide concentrations for 1,000 years after disposal in water withdrawn from most Class I ground waters to the concentrations allowed by the Agency's interim drinking water standards (unless concentrations in the Class I ground waters already exceed the limits in 40 CFR 141, in which case this set of requirements would limit the increases in the radionuclide concentrations to those specified in 40 CFR 141). Subpart B also contains informational guidance for implementation of the disposal standards to clarify the Agency's intended application of these standards, which address a time frame without precedent in environmental regulations. Although disposal of these materials in mined geologic repositories has received the most attention, the disposal standards apply to disposal by any method, except disposal directly into the oceans or ocean sediments.

This notice describes the final rule that the Agency developed after considering the public comments received on the proposed rule published on December 29, 1982, and the recommendations of a technical review conducted by the Agency's Science Advisory Board (SAB). The major comments received on the proposed standards are summarized together with the Agency's responses to them. Detailed responses to all the comments received are discussed in the Response to Comments Document prepared for this final rule.

DATE: These standards shall be promulgated for purposes of judicial review at 1:00 p.m. eastern time on [two weeks after the date of publication in the FEDERAL REGISTER]. These standards shall become effective on [60 days after the date of publication in the FEDERAL REGISTER].

ADDRESSES: Background Information—The technical information considered in developing this rule, including risk assessments of disposal of these wastes in mined geologic repositories, is summarized in the Background Information Document (BID) for 40 CFR 191, EPA 520/1-85-023. Single copies of both the BID and the Response to Comments Document, as available, may be obtained from the Program Management Office (ANR-458), Office of Radiation Programs, Environmental Protection Agency, Washington, D.C. 20460; telephone number (703) 557-9351.

Docket—Docket Number R-82-3 contains the rulemaking record for 40 CFR 191. The docket is available for inspection between 8 a.m. and 4 p.m. on weekdays in the West Tower Lobby, Gallery 1, Central Docket

Section, 401 M Street, S.W., Washington, D.C. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Dan Egan or Ray Clark, Criteria and Standards Division (ANR-460), Office of Radiation Programs, Environmental Protection Agency, Washington, D.C. 20460; telephone number (703) 557-8610.

SUPPLEMENTARY INFORMATION: Fissioning of nuclear fuel in nuclear reactors creates a small quantity of highly radioactive materials. Virtually all of these materials are retained in the "spent" fuel elements when they are removed from the reactor. If the fuel is then reprocessed to recover unfissioned uranium and plutonium, most of the radioactivity goes into acidic liquid wastes that will later be converted into various types of solid materials. These highly radioactive liquid or solid wastes from reprocessing spent nuclear fuel have traditionally been called "high-level wastes." If it is not to be reprocessed, the spent fuel itself becomes a waste. The nuclear reactors operated by the nation's electrical utilities currently generate about 2,000 metric tons of spent fuel per year. The relatively small physical quantity of these wastes is apparent when compared to the chemically hazardous wastes regulated under the Resource Conservation and Recovery Act, which are produced at a rate of about 150,000,000 metric tons per year.

Although they are produced in small quantities, proper management and disposal of high-level wastes and spent nuclear fuel are essential because of the inherent hazard of the large amounts of radioactivity they contain. Spent fuel from commercial nuclear power reactors contains about 1.6 billion curies of radionuclides with half-lives greater than 20 years. Over the next decade, this inventory is projected to grow at a rate of about 300 million curies per year from reactors currently licensed to operate. Most of this spent fuel is currently stored at reactor sites. Reprocessing reactor fuel used for national defense activities has produced about 700 million curies of radionuclides with half-lives greater than 20 years. Most of these wastes are stored in various liquid and solid forms on three Federal reservations in Idaho, Washington, and South Carolina.

In addition, a wide variety of wastes contaminated with man-made radionuclides heavier than uranium have been created by various processes, mostly from the atomic energy defense activities conducted by the DOE and its predecessor agencies (the Atomic Energy Commission and the Energy Research and Development Administration). These wastes are usually called "transuranic" wastes. Most of them are stored at Federal reservations in Idaho, Washington, New Mexico, and South Carolina.

NATIONAL PROGRAMS FOR DISPOSAL OF THESE WASTES

Since the inception of the nuclear age in the 1940's, the Federal government has assumed ultimate responsibility for the care and disposal of these wastes regardless of whether they are produced by commercial or national defense activities. In October 1976, President Ford ordered a major expansion of the Federal program to demonstrate a permanent disposal method for high-level wastes. The Agency was directed to develop generally applicable environmental standards to govern the management and disposal of these wastes as part of this initiative. Among EPA's first activities in response to this directive were a series of public workshops conducted in 1977 and 1978 to better understand the various public concerns and technical issues associated with radioactive waste disposal.

In 1981, the DOE, after completing a comprehensive programmatic environmental impact statement, decided to focus the national program on disposal in mined geologic repositories (46 FR 26677). In 1982, Congress passed the Nuclear Waste Policy Act (henceforth designated "NWPA"), which President Reagan signed into law on January 7, 1983. The NWPA contains several provisions that are relevant to this rulemaking. First, it affirmed the DOE's 1981 decision that mined repositories should receive primary emphasis in the national program, although research on some other technologies would be continued. Second, it established formal procedures regarding the evaluation and selection of sites for geologic repositories, including steps for the interaction of affected States and Indian tribes with the Federal government regarding site selection decisions. Third, the NWPA levied a fee on utilities that generate electrical power with nuclear reactors in order to pay for Federal management and disposal of their spent fuel or high-level wastes. Fourth, the NWPA reiterated the existing responsibilities of the Federal agencies involved in the national program to develop mined geologic repositories, and it assigned some additional tasks regarding site evaluation. Finally, the Act provided a timetable for several key milestones that the Federal agencies were to meet in carrying out the program.

Section 121 of the NWPA reiterated the Agency's responsibility for developing the overall framework of requirements needed to assure protection of public health and the environment, in accordance with the Agency's authorities under the Atomic Energy Act of 1954 and Reorganization Plan Number 3 of 1970. Section 121 also called for the Agency to promulgate these standards by January 7, 1984. The Agency did not meet this deadline. On February 8, 1985, the Natural Resources Defense Council and four other environmental interest groups filed suit to bring about compliance with the NWPA mandate. This litigation was settled by the Agency and the plantiffs agreeing to a consent order requiring promulgation not later than August 15, 1985. The generally applicable environmental standards promulgated by this notice satisfy the terms of this consent order. However, they also represent the culmination of an effort that began almost nine years ago and that has included frequent interactions with the public to help formulate standards responsive to the concerns about disposal of these dangerous materials.

OBJECTIVE AND IMPLEMENTATION OF THE STANDARDS

In developing the standards for disposal of spent nuclear fuel and high-level and transuranic radioactive wastes, the Agency has carefully evaluated the capabilities of mined geologic repositories to isolate the wastes from the environment. Because such repositories are capable of performing so well, it has been possible to choose containment requirements that will provide exceptionally good protection to current and future populations for at least 10,000 years after disposal. In fact, EPA's analyses indicate that the small residual risks allowed by the disposal standards would be comparable to the risks that future populations would have been exposed to if the uranium ore used to produce the high-level wastes had not been mined to begin with.[*] The Agency believes that achieving this protection should not significantly increase the cost or difficulty of carrying out the national program for disposing of the wastes from commercial nuclear power plants. In addition, the containment requirements in the final rule are complemented by six qualitative assurance requirements designed to provide confidence that the containment requirements will be met, given the substantial uncertainties inherent in predictions of system performance over 10,000 years. Because of this comprehensive framework, the Agency is confident that the national program to dispose of these wastes will be carried out with exceptional protection of public health and the environment.

The Nuclear Regulatory Commission (NRC) and the DOE are responsible for implementing these standards. The NRC has already promulgated procedural and technical requirements in 10 CFR Part 60 for disposal of high-level wastes in mined geologic repositories (46 FR 13971, 48 FR 28194). The NRC will obtain compliance with 40 CFR 191 for disposal of all high-level wastes by issuing licenses to the DOE, in accordance with 10 CFR 60, at various steps in the construction and operation of a repository. The NWPA directs the DOE to select a number of potential sites for geologic repositories, successively reducing this set of alternatives from five to three to one, in consultation with affected States and Indian Tribes and with participation by the public in key steps in the selection process. The DOE will accomplish this through use of site selection guidelines (10 CFR Part 960) that it has developed in accordance with Section 112 of the NWPA Both NRC's 10 CFR 60 and DOE's 10 CFR 960 incorporate the standards the Agency is promulgating today as the overall performance requirements for a geologic repository. Both of these other rules were designed in concert with EPA's ongoing development of 40 CFR 191. However, both NRC and DOE must now review these regulations to determine what specific changes will be needed to properly implement the final version of 40 CFR 191.

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[*] Specifically, the Agency estimates that compliance with the disposal standards would allow no more than 1,000 premature deaths from cancer in the first 10,000 years after disposal of the high-level wastes from 100,000 metric tons of reactor fuel: an average of no more than one premature death every ten years. As this residual risk level is referred to in the following discussion, it should be remembered that it is a speculative calculation that is primarily intended as a tool for comparing risk levels; it should not be considered a reliable projection of the "real" number of health effects resulting from compliance with the disposal standards.

REVIEW OF THE PROPOSED STANDARDS

On December 29, 1982, shortly before the NWPA was enacted, the Agency published 40 CFR 191 for public review (47 FR 58196) and asked that comments be received by May 2, 1983. Eighty-three substantive replies were received from a broad spectrum of private citizens, public interest groups, members of the scientific community, representatives of industry, and State and Federal agencies. These responses contained information and recommendations regarding seven issues for which the Agency sought further public comment (48 FR 21666). Questions concerning these issues were directed to all of the witnesses at two public hearings held during May 1983 in Washington, D.C. and in Denver (48 FR 13444). Copies of these questions were also sent to all those who responded to the initial request for comment, and the availability of these questions was announced in the FEDERAL REGISTER (48 FR 21666). The comment period was then held open until June 20, 1983 to receive responses to these additional questions. Responses to major comments—including all those specifically highlighted for public review—are summarized below. Detailed responses to the full range of comments received is described in the Response to Comments Document prepared for the final rule.

REVIEW OF THE TECHNICAL BASIS OF THE STANDARDS

In parallel with this public review and comment, the Agency conducted an independent scientific review of the technical basis for the proposed 40 CFR 191 through a special Subcommittee of the Agency's Science Advisory Board (SAB) (48 FR 509). This Subcommittee held nine public meetings from January 18, 1983, through September 21, 1983, and prepared a final report that was transmitted on February 17, 1984. While finding that the Agency had generally prepared comprehensive and scientifically competent technical analyses to support the proposed standards, the SAB review developed 46 findings and recommendations regarding specific improvements in the technical analyses and in the standards themselves. Since many of the SAB recommendations were to be considered in developing the final rule, the Agency sought public comment on the information and recommendations presented in the final SAB report (49 FR 19604).

Most of the SAB recommendations involve specific details of the technical assessments and judgments the Agency made in developing these standards. After evaluating the public comments received on the SAB report, the Agency agrees with almost all of the SAB's technical recommendations and has made corresponding changes in the technical basis of the final rule. A few of the Subcommittee's recommendations have implications that involve broader policy judgments. These recommendations have been treated as part of the public comment record and are described below as the major comments on the proposed 40 CFR 191 are discussed. A complete itemization of the Agency's responses to each of the findings and recommendations of the SAB is contained in the Response to Comments Document, together with a synopsis of the public comments on the SAB report.

SUMMARY OF THE FINAL RULE

The rule being promulgated today establishes generally applicable environmental standards for the management and disposal of spent nuclear fuel, high-level radioactive wastes, and transuranic radioactive wastes. The final rule differs in a number of ways from the proposed rule because of changes the Agency has made in response to public comments and in response to the recommendations of the technical review by the Agency's Science Advisory Board. This section provides an overview of the major provisions of the final rule, and changes from the proposed rule are noted. More detail on many of these provisions is provided later as part of the discussion of the comments considered in development of 40 CFR 191. The final rule:

(1) Applies to management and disposal of spent nuclear fuel, high-level radioactive wastes as defined by the NWPA, and transuranic wastes containing more than 100 nanocuries per gram of alpha-emitting transuranic isotopes, except for wastes that either NRC or the Administrator determines do not need the degree of isolation required by this rule. (The proposed rule applied to spent nuclear fuel, high-level wastes exceeding a specific set of concentration limits, and to transuranic wastes containing more than 100 nanocuries per gram.)

(2) Through Subpart A, "Standards for Management and Storage," establishes limits on annual doses to members of the public of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ from exposures associated with management, storage, and preparation for disposal of any of these materials at facilities regulated by the NRC. These limits apply to the combined exposures from all NRC-licensed facilities covered by this Part or 40 CFR 190, the Agency's standards for the commercial uranium fuel cycle. Subpart A also limits annual doses to members of the public from management and storage operations at DOE disposal facilities that are not regulated by the NRC to 25 millirems to the whole body and 75 millirems to any other organ. (The proposed rule applied to the combined exposures from operations regulated by 40 CFR 190, waste management and storage operations regulated by the NRC or Agreement States, and waste management and storage operations conducted at all DOE facilities.) Subpart A also contains a provision that allows the Administrator to issue alternative standards for waste management and storage operations at DOE disposal facilities that are not regulated by the NRC. (The proposed rule contained a provision to allow the implementing agency, either the NRC or the DOE, to grant variances for unusual operating conditions.)

(3) Establishes several sets of requirements for disposal of these wastes through Subpart B, "Standards for Disposal." The primary standards are containment requirements that limit projected releases of radioactivity to the accessible environment for 10,000 years after disposal. Equally important is a set of six assurance requirements chosen to provide adequate

confidence that the containment requirements will be met. In addition, Subpart B of the final rule includes individual protection requirements that limit annual exposures from the disposal facility to members of the public in the accessible environment to 25 millirems to the whole body and 75 millirems to any organ for 1,000 years after disposal. The Subpart also contains ground water protection requirements that limit radioactivity concentrations in water withdrawn from most Class I ground waters near a disposal system (as defined in conjunction with the Agency's Ground-Water Protection Strategy published in August 1984) for 1,000 years after disposal. Finally, Subpart B provides guidance for implementation that indicates how the Agency intends the various numerical standards to be applied. (The proposed rule contained only containment requirements, assurance requirements, and procedural requirements; this last category provided some of the basis for the "guidance for implementation" in the final rule.) Major provisions of each of these sets of requirements include the following:

(a) The containment requirements (Section 191.13) limit the total projected releases of specific radionuclides over the entire 10,000 year period after disposal. Releases from all expected and accidental causes are included, except for releases from conceivable events that are judged to have an incredibly small likelihood of occurrence. Quantitative terms are used to identify the probabilities of the releases to which the containment requirements apply; however, the final rule acknowledges that determination of compliance will have to tolerate much larger uncertainties than would be appropriate for short-term estimates and that judgments may have to be substituted for quantitative predictions in certain situations. Disposal in compliance with the containment requirements is projected to cause no more than 1,000 premature cancer deaths over the entire 10,000-year period from disposal of all existing high-level wastes and most of the wastes yet to be produced by currently operating reactors—an average of 0.1 fatality per year. This level of residual risk to future generations would be comparable to the risks that those generations would have faced from the uranium ore used to create the wastes if the ore had never been mined. Actual risks will probably be significantly less because of the conservative approach called for by the other parts of Subpart B. (The quantitative probabilities in the proposed rule were an order of magnitude smaller than those incorporated into the final rule. The release limits in the final rule are different than those in the proposed rule due to changes in EPA's technical analyses that were recommended by the SAB Subcommittee; however, the level of residual risk is the same as for the proposed rule.)

(b) The assurance requirements (Section 191.14) call for cautious steps to be taken in disposing of these wastes because of the inherent uncertainties in selecting and designing disposal systems that must be very effective for more than 10,000 years. The assurance requirements incorporate the following principles:

(i) Although active institutional controls, such as guarding and maintaining a disposal site, should be encouraged, they cannot be relied upon to isolate these wastes from the environment for more than 100 years after disposal. (The proposed rule limited reliance to "a few hundred years" after disposal.)

(ii) Disposal systems must be monitored to detect substantial changes from their expected performance until the implementing agency determines that there are no significant concerns to be addressed by further monitoring. (This requirement was not included in the proposed rule.)

(iii) The sites where disposal systems are located must be identified by permanent markers, widespread records, and other passive institutional controls to warn future generations of the dangers and location of the wastes.

(iv) Disposal systems must use several different types of barriers, including both engineered and natural ones, to isolate the wastes from the environment to help guard against unexpectedly poor performance from one type of barrier.

(v) Sites for disposal systems should be selected to avoid places where resources have previously been mined, where there is a reasonable expectation of exploration for scarce or easily accessible resources, or where there is a significant concentration of any material which is not otherwise widely available. (The wording in the proposed rule would have ruled out sites with a significant possibility of being considered for resource exploration in the future. The final rule revises this requirement to allow use of sites with some resource potential if they have other significant advantages compared to potential alternative sites.)

(vi) Recovery of most of the wastes must not be precluded for a reasonable period after disposal if unforeseen events require this in the future.

(c) The individual protection requirements (Section 191.15) limit exposures to members of the public in the accessible environment from the disposal system to 25 millirems to the whole body and 75 millirems to any organ. These requirements apply to undisturbed performance of the disposal system for 1,000 years after disposal. All potential pathways of radiation exposure from the disposal system to people must be considered, including the assumption that individuals consume all of their drinking water (2 liters per day) from any "significant source of ground water" located outside the "controlled area" established around a disposal system. A "significant source" is identified by several parameters intended to describe an aquifer sufficient to meet the needs of a "community water system" as defined in the Agency's National Interim Primary Drinking Water Regulations (40 CFR 141). (No explicit individual protection requirements were included in the proposed rule.)

(d) The ground water protection requirements (Section 191.16) limit the concentrations of radioactivity (or the increases in concentrations, if preexisting concentrations already exceed these limits) in waters withdrawn from most Class I sources of ground water near a disposal system to no more than 15 picocuries per liter of alpha-emitting radionuclides (including no more than 5 picocuries per liter of radium-226 and radium-228 but excluding radon) and to no more than the combined concentrations of radionuclides that emit either beta or gamma radiation that would produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem if individuals consumed all of their drinking water from that source of ground water. These concentration limits are similar to those set in

40 CFR 141 for community water systems. Like the individual protection requirements, the ground water protection requirements apply to undisturbed behavior of the disposal system for a period of 1,000 years after disposal. (No explicit ground water protection requirements were included in the proposed rule.)

(e) Section 191.17 of the final rule establishes minimum procedural requirements that the Administrator must follow if additional information considered in the future indicates that it would be appropriate to modify any portion of the disposal standards through further rulemaking. (No similar provision was included in the proposed rule.)

(f) The "guidance for implementation" included as Appendix B to the final rule describes certain analytical approaches and assumptions through which the Agency intends the various long-term numerical standards of Subpart B to be applied. This guidance is particularly important because there are no precedents for the implementation of such long-term environmental standards, which will require consideration of extensive analytical projections of disposal system performance. (The proposed rule contained a corresponding, but less extensive, section entitled "procedural requirements.")

OVERALL APPROACH OF THE FINAL RULE

In general, the Agency developed the various elements of this rule by balancing several perspectives. One set of considerations were the expected capabilities of the waste management and disposal technologies to reduce both short- and long-term risks to public health and the environment. These capabilities were examined through a number of performance assessments of the waste management, storage, and disposal facilities planned for the wastes generated by commercial nuclear power plants. Since detailed plans have not yet been determined for disposition of the wastes generated by atomic energy defense activities, similar assessments were generally not performed for these materials. A second consideration, where applicable, was consistency with related environmental standards for radiation exposure. A third factor was evaluation of various benchmarks to assess the acceptability of the residual risks that might be allowed by the rule. This was particularly important for the disposal standards, where there were few precedents to guide the Agency's judgements. Finally, the Agency placed considerable emphasis on the public concerns expressed during the various phases of this rulemaking, particularly where these concerns involved addressing the substantial uncertainties inherent in the unprecedented time periods of interest.

The final rule reflects a combination of all these perspectives—no single factor predominated. For instance, no portion of this rule is based solely on projections of the "best" protection that technology might provide. If this had been the case, the rule would have been significantly different. On the other hand, the rule cannot be interpreted as setting precedents for "acceptable risk" levels to future generations that should not be exceeded regardless of the circumstances. Instead, because of a number of unique circumstances, the Agency has been able to develop standards for the management and disposal of these wastes that are both reasonably achievable—with little, if any, effort beyond that already planned for commercial wastes—and that limit risks to levels that the

Agency believes are clearly acceptably small. The following paragraphs describe how these various perspectives were used in developing the final rule.

Standards for Management and Storage (Subpart A)

Upon surveying the expected performance of the technologies planned for the management, storage, and preparation of these wastes for disposal, the Agency found that the likely exposures to members of the public would generally be very small. Therefore, compatibility with related radiation protection standards became a more important perspective for Subpart A.

For waste management and storage operations to be regulated by the NRC, the most relevant existing standards are those provisions of 40 CFR Part 190 that limit annual exposures of members of the public to 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ from uranium fuel cycle facilities. Accordingly, the Agency has decided to extend this coverage to include such waste management and storage operations so that the combined exposure from all of the NRC-licensed facilities covered under Part 190 and Subpart A of Part 191 shall not exceed these limits. This will include all operations prior to final closure at high-level waste disposal facilities, since these are to be regulated by the NRC.

For waste management and storage operations conducted at atomic energy defense facilities operated for the Department of Energy (which are not regulated by the NRC), the most relevant existing standards are the 40 CFR Part 61 limitations on air emissions of radionuclides that were recently promulgated under the Agency's Clean Air Act authorities (50 FR 5190). These standards limit annual exposures to members of the public to 25 millirems to the whole body and 75 millirems to any organ, with less stringent alternative standards available if it can be shown that no member of the public will receive a continuous exposure of more than 100 millirems per year or an infrequent exposure of more than 500 millirems per year from all sources (excluding natural background and medical exposures). These Clean Air Act standards are applicable to those facilities not covered by 40 CFR Parts 190, 191 or 192. For DOE waste disposal facilities covered by this rule but not regulated by NRC (i.e., those for defense transuranic wastes), the Agency has included standards in Subpart A similar to those included in the Clean Air Act rule.

For other DOE waste management and storage operations, which are usually conducted on large facilities with many other potential sources of radionuclide emissions, the Agency believes that continued regulation under the broader scope of 40 CFR 61 is the most effective and practical approach. Otherwise, similar types of emissions from adjoining operations would have to be assessed and regulated through separate rules developed under different authorities; this would cause complex implementation practices without providing any additional protection.

Standards for Disposal (Subpart B)

Developing the standards for disposal of spent fuel and high-level and transuranic wastes involved much more unusual circumstances than those for waste management and storage. Because these materials are dangerous for so long, very long time frames are of interest. Standards must be implemented in the design phase for these disposal systems because active surveillance cannot be relied upon over such periods. At the same time, the standards must accommodate large uncertainties, including uncertainties in our current knowledge about disposal system behavior and the inherent uncertainties regarding the distant future. Subpart B addresses these issues by combining several different types of standards. The primary objective of these standards is to isolate most of the wastes from man's environment by limiting long-term releases and the associated risks to populations. In addition, Subpart B limits risks to individuals in ways compatible with this primary objective.

Although developed primarily through consideration of mined geologic repositories, these disposal standards apply to disposal of spent fuel and high-level and transuranic radioactive wastes by any method—with one exception. The standards do not apply to ocean disposal or disposal in ocean sediments because such disposal of high-level waste is prohibited by the Marine Protection, Research, and Sanctuaries Act of 1972. If this law is ever changed to allow such disposal (DOE continues to study the feasibility of this technology, consistent with the NWPA), the Agency will develop appropriate regulations in accordance with the different authorities that would apply.

Also, these disposal standards do not apply to wastes that have already been disposed of. The various provisions of Subpart B are intended to be met through a combination of steps involving disposal system site selection, design, and operational techniques (i.e., engineered barriers). Therefore, the Agency believes it appropriate that these disposal standards only apply to disposal occuring after the standards have been promulgated—so that they can be taken into consideration in devising the proper selection of controls. Some transuranic wastes produced in support of national defense programs were disposed of before the current DOE procedures for transuranic waste management were adopted in 1970. The exclusion of wastes already disposed of applies to these transuranic wastes, for which selection of disposal system sites, designs, and operational techniques are no longer options.

Containment Requirements (Section 191.13)

To develop the containment requirements, the Agency assumed that some aspects of the future can be predicted well enough to guide the selection and development of disposal systems for these wastes. A period of 10,000 years was considered because that appears to be long enough to distinguish geologic repositories with relatively good capabilities to isolate wastes from those with relatively poor capabilities. On the other hand, this period is short enough so that major geologic changes are unlikely and repository performance might be reasonably projected.

The Agency assessed the performance of a number of model geologic repositories similar to those systems now being considered by DOE. Potential radionuclide releases over 10,000 years were evaluated, and very general models of environmental transport and a linear, non-threshold dose-effect relationship were used to relate these releases to the incidence of premature cancer deaths they might cause. For the various repository types, these assessments indicate that disposal of the wastes from 100,000 metric tons of reactor fuel would cause a population risk ranging from no more than about ten to a little more than one hundred premature deaths over the entire 10,000 year period, assuming that the existing provisions of 10 CFR 60 regarding engineered barriers are met.

The Agency also evaluated the health risks that future generations would be exposed to from the amount of uranium ore needed to produce 100,000 metric tons of reactor fuel, if this ore had not been mined to begin with. Population risks ranging between 10 and 100,000 premature cancer deaths over 10,000 years were associated with this much unmined uranium ore, depending upon the analytical assumptions made.

These analyses, which have been updated from those prepared for the proposed standards, reinforce the Agency's conclusion that limiting radionuclide releases to levels associated with no more than 1,000 premature cancer deaths over 10,000 years from disposal of the wastes from 100,000 metric tons of reactor fuel satisfies two important objectives. First, it provides a level of protection that appears reasonably achievable by the various options being considered within the national program for commercial wastes. Second, the Agency believes that such a limitation would clearly keep risks to future populations at acceptably small levels, particularly because it appears to limit risks to no more than the midpoint of the range of estimated risks that future generations would have been exposed to if the uranium ore used to create the wastes had never been mined.. Thus, because mined geologic repositories appear capable of providing such good protection, the Agency has decided to establish containment requirements that meet these two objectives.

The specific release limits for different radionuclides in Table 1 of the final rule were developed by estimating how many curies of each radionuclide would cause 1,000 premature deaths over 10,000 years if released to the environment. The limits were then stated in terms of the allowable release from 1,000 metric tons of reactor fuel (so that the actual curie values in Table 1 correspond to a risk level of 10 premature deaths over 10,000 years). All of these limits have been rounded to the nearest order of magnitude because of the approximate nature of these calculations. For particular disposal systems, release limits based upon the amount of waste in the system will be developed and will be used in a formula that insures that the desired risk level will not be exceeded if releases of more than one type of radionuclide are predicted. For some of the wastes covered by this rule, 1,000 metric tons of reactor fuel is not the appropriate unit of waste. In these situations, the various Notes to Table 1 provide instructions on how to calculate the proper release limits. In particular, the final rule includes provisions for high-level wastes from reactor fuels that have received substantially different uses in national defense applications (and contain much different amounts of radioactivity) than is typical of most reactor fuel used to generate electricity. The proposed rule would have allowed releases for these different types of fuels to occur in much different proportions to their total radioactivity than the Agency intended.

The release limits apply to radionuclides that are projected to move into the "accessible environment" during the first 10,000 years after disposal. The accessible environment includes all of the atmosphere, land surface, surface waters, and oceans. However, it does not include the lithosphere (and the ground water within it) that is below the "controlled area" surrounding a disposal system. The standards are formulated this way because the properties of the geologic media around a mined repository are expected to provide much of the disposal system's capability to isolate these wastes over these long time periods. Thus, a certain area of the natural environment is envisioned to be dedicated to keeping these dangerous materials away from future generations and may not be suitable for certain other uses. In the final rule, this "controlled area" is not to exceed 100 square kilometers and is not to extend more than five kilometers in any direction from the original emplacement of the wastes in the disposal system. The implementing agencies may choose a smaller area whenever appropriate.

The containment requirements apply to accidental disruptions of a disposal system as well as to any expected releases. Accordingly, they are stated in terms of the probability of releases occuring. This is done in two steps.

First, the release limits calculated in accordance with Notes 1 through 5 to Table 1 apply to those release levels that are projected to occur with a cumulative probability greater than 0.1 for the entire 10,000-year period over which these disposal standards apply. This includes the total releases from those processes that are expected to occur as well as relatively likely disruptions (which the Agency assumes will primarily include predictions of inadvertent human intrusion).

Second, these release limits multiplied by ten apply to all of the releases projected to occur with a cumulative probability greater than 0.001

over the 10,000-year period. The Agency expects that this will include releases that might occur from the more likely natural disruptive events, such as fault movement and breccia pipe formation (near soluble media such as salt formations). This range of probabilities was selected to include the anticipated uncertainties in predicting the likelihood of these natural phenoemna. Greater releases are allowed for these circumstances because they are so unlikely to occur.

Finally, the containment requirements place no limits on releases projected to occur with a cumulative probability of less than 0.001 over 10,000 years. Probabilities this small would tend to be limited to phenomena such as the appearance of new volcanos outside of known areas of volcanic activity, and the Agency believes there is no benefit to public health or the environment from trying to regulate the consequences of such very unlikely events.

The containment requirements call for a "reasonable expectation" that their various quantitative tests be met. This phrase reflects the fact that unequivocal numerical proof of compliance is neither necessary or likely to be obtained. A similar qualitative test, that of "reasonable assurance," has been used with NRC regulations for many years. Although the Agency's intent is similar, the NRC phrase has not been used in 40 CFR 191 because "reasonable assurance" has come to be associated with a level of confidence that may not be appropriate for the very long-term analytical projections that are called for by 191.13. The use of a different test of judgement is meant to acknowledge the unique considerations likely to be encountered upon implementation of these disposal standards.

Assurance Requirements (Section 191.14)

In contrast to the containment requirements, the assurance requirements were developed from that point of view that there may be major uncertainties and gaps in our knowledge of the expected behavior of disposal systems over many thousands of years. Therefore, no matter how promising the analytical projections of disposal system performance appear to be, these materials should be disposed in a cautious manner that reduces the likelihood of unanticipated types of releases. Because of the inherent uncertainties associated with these long time periods, the Agency believes that the principles embodied in the assurance requirements are important complements to the containment requirements that should insure that the level of protection desired is likely to be achieved.

Each of the assurance requirements was chosen to reduce the potential harm from some aspect of our uncertainty about the future. Designing disposal systems with limited reliance on active institutional controls reduces the risks if future generations do not maintain surveillance of disposal sites. On the other hand, planning for long-term monitoring helps reduce the chances that unexpectedly poor performance of a disposal system would go unnoticed. Using extensive markers and records and avoiding resources when selecting disposal sites both serve to reduce the chances that people may inadvertently disrupt a disposal system because of incomplete understanding of its location, design, or hazards. Designing disposal systems to include multiple types of barriers, both engineered and natural, reduces the risks if one type of barrier performs more poorly than current knowledge indicates. Finally, designing disposal systems so that it is feasible for the wastes to be located and recovered gives future generations an opportunity to rectify the situation if new discoveries indicate compelling reasons (which would not be foreseeable now) to change the way these wastes are disposed of.

The proposed standards contained two other assurance requirements intended to reduce the risks of uncertainty. One of them called for these wastes to be disposed of promptly to reduce the uncertainties associated with storing these materials for indefinitely long times with methods that require active human involvement. However—after this rule was published for public comment—the NWPA was enacted, setting up mandates and procedures intended to insure development of the necessary disposal systems for spent fuel and high-level wastes. Furthermore, the Department has made substantial progress towards developing a repository for disposal of the transuranic wastes from atomic energy defense activities. Because of these steps, the Agency decided that the call for prompt disposal was no longer needed, and this assurance requirement has not been included in the final rule.

The other proposed assurance requirement deleted from the final rule is the provision that called for releases to be kept as small as reasonably achievable even when the numerical containment requirements have been complied with. This would have increased the confidence of achieving the desired level of protection even if there were major uncertainties in analytical projections of long-term isolation. However, the Agency does not believe that it is necessary to retain this assurance requirement in the final standards because of two aspects of the related rules subsequently promulgated by the NRC and DOE for disposal of spent fuel and high-level wastes.

First, NRC's 10 CFR 60 implemented the multiple barrier principle by requiring very good performance from two types of engineered components: a 300 to 1,000-year lifetime for waste packages during which there would be essentially no expected release of waste, and a subsequent long-term release rate from the waste form of no more than one part in 100,000 per year. The Agency fully endorses this approach and believes that it represents the best performance reasonably achievable for currently forseeable engineered components. Second, the DOE has included a provision in its site selection guidelines (10 CFR 960) that calls for significant emphasis to be placed on selecting sites that demonstrate the lowest releases over 100,000 years compared to the other alternatives available. Particularly because of the longer time frame involved in this comparison, the Agency believes that this provides adequate encouragement to choose sites that provide the best isolation capabilities available. Therefore, the concept of keeping long-term releases as small as reasonably achievable has been embodied by other agencies' regulations for both the engineered and natural components of disposal systems.

The final rule incorporates the five assurance requirements plus the requirement for long-term monitoring, but it makes them applicable only to disposal facilities that are not regulated by the NRC. In its comments on the proposed rule, the NRC objected to inclusion of the assurance requirements, asserting that they were not properly part of the Agency's authorities assigned by Reorganization Plan No. 3 of 1970. The Agency continues to believe that provisions such as the assurance requirements are an appropriate part of generally applicable standards where they are necessary to establish the regulatory context for numerical standards—as they are in these circumstances because of the major uncertainties involved. However, the two agencies have agreed to resolve this issue by having the Commission modify 10 CFR 60 where necessary to incorporate the intent of the assurance requirements, rather than have them included in 40 CFR 191 for NRC-licensed disposal facilities. Thus, 10 CFR 60 will establish the context needed for appropriate implementation of 40 CFR 191.

The NRC staff is preparing the appropriate revisions to Part 60 and has told the Agency that they will be published in the FEDERAL REGISTER for public review and comment within approximately 120 days of todays's promulgation of 40 CFR 191. EPA has provided NRC with all of the comments received on the assurance requirements during the 40 CFR 191 rulemaking, and the Agency will participate in the NRC rulemaking to facilitate our objective of having the intent of all of the assurance requirements embodied in Federal regulation. Finally, the Agency will review the record and outcome of the Part 60 rulemaking to determine if any subsequent modifications to 40 CFR 191 are needed.

Individual and Ground Water Protection Requirements (Sections 191.15 and 191.16).

While the primary objective of both the proposed and final disposal standards has been to limit potential long-term releases from disposal systems (and the population risks associated with such releases), these two sections have been added to the final rule to provide protection for those individuals in the vicinity of a disposal system. There are a number of difficult issues involved in formulating standards for individual protection in this situation, as discussed later in the "Release Limits vs. Individual Dose Limits" section. However, after evaluating the various comments received on this topic, the Agency believes that there are also important advantages in providing for individual protection in ways compatible with the containment and assurance requirements. In discussing this issue, the SAB Subcommittee stated that: "We support the use of a population risk criteria. We believe it is impractical to provide absolute protection to every individual for all postulated events or for very long periods. On the other hand, in our view it is important that, for the first several hundred years, residents of the region immediately outside the accessible environment have very great assurance that they will suffer no, or negligible, ill effects from the repository."

The individual protection requirements in the final rule limit the annual exposure from the disposal system to a member of the public in the accessible environment, for the first 1,000 years after disposal, to no more than 25 millirems to the whole body or 75 millirems to any organ. These limitations apply to the predicted behavior of the disposal system, including consideration of the uncertainties in predicted behavior, assuming that the disposal system is not disrupted by human intrusion or the occurence of unlikely natural events. The Agency chose the limits of 25 millirem/year to the whole body and 75 millirem/year to any organ because it believes that they represent a sufficiently stringent level of protection for situations where no more than a few individuals are likely to receive this exposure. If such an individual were exposed to this level over a lifetime (which seems particularly unlikely given the localized pathways through which waste might escape from a geologic repository), the Agency estimates this would cause a 5×10^{-4} chance of incurring a premature fatal cancer.

In choosing a time period for these requirements to protect individuals nearby disposal systems, the Agency took into account concerns such as those expressed by the SAB by examining the effects of choosing different time frames. As 10,000 years was chosen for the containment requirements because it is long enough to encourage use of disposal sites with natural characteristics that enhance long-term isolation, 1,000 years was chosen for the individual protection provisions because the Agency's assessments indicate it is long enough to insure that particularly good engineered barriers would need to be used at potential sites where some ground water would be expected to flow through a mined geologic repository. Use of a time much shorter than 1,000 years would not call for substantial engineered barriers even at disposal sites with a lot of ground water flow.

On the other hand, demonstrating compliance with individual exposure limits for times much longer than 1,000 years appears to be quite difficult because of the analytical uncertainties involved. It would require predicting radionuclide concentrations—even from releases of tiny portions of the waste—in all the possible ground water pathways flowing in all directions from the disposal system, at all depths down to 2,500 feet, as a function of time over many thousands of years. At some of the sites being considered (and possibly all of them, depending upon what is discovered during site characterization) the only certain way to comply with such requirements for periods on the order of 10,000 years appears to be to use very expensive engineered barriers that would rule out any potential releases over most of this period. While such barriers could provide longer-term protection for individuals, they would not provide substantial benefits to populations because the containment and assurance requirements already reduce population risks to very small levels.

Based on all of these considerations, the Agency has decided that a 1,000-year duration is adequate for quantitative limits on individual exposures after disposal. For longer time periods, several of the qualitative assurance requirements should help to reduce the chances that individuals will receive serious radiation exposures. In addition, 40 CFR 191 in no way limits the future applicability of the Agency's drinking water standards (40 CFR 141)—which protect community water supply systems through institutional controls—or of similar standards that future generations may chose to adopt.

In assessing the performance of a disposal system with regard to individual exposures, all pathways of radioactive material or radiation from the disposal system to people shall be considered. In particular, the assessments must assume that individuals consume all of their drinking water (2 liters per day) from any portion of a "significant source of ground water" anywhere outside of the "controlled area" surrounding the disposal system. Significant sources of ground water are defined to include underground formations that are likely to be able to provide enough water for a community water system as defined in 40 CFR 141. (More information regarding this definition is provided later in the "Release Limits vs. Individual Dose Limits" discussion.) Formations that could only provide smaller amounts of potable water have not been included because the Agency wants to avoid discriminating against the use of low-productivity geologic formations that might provide very good long-term isolation as disposal sites. The Agency believes this is reasonable for these standards because of the very small number of such disposal facilities that are contemplated (no more than three or four over the next 100 years). However, the Agency has no plans to use this classification for other ground water related standards, which usually affect a far greater number of situations.

The Agency has not required these individual protection provisions to assume ground water use within the controlled area because geologic media within the controlled area are an integral part of the disposal system's capability to provide long-term isolation. (But if the implementing agency plans to allow individuals to use ground water within the controlled area, such planned use would have to be considered within the pathways evaluated to determine compliance with Section 191.15.) The potential loss of ground water resources is very small because of the small number of such disposal facilities contemplated. Nevertheless, the Agency has also added ground water protection requirements to the final rule (Section 191.16) that protect certain sources of ground water even within the controlled area. These ground water protection requirements are similar to the individual protection requirements because they apply to undisturbed performance for 1,000 years after disposal. However, the ground water protection requirements apply only to those Class I ground waters, as they are identified in accordance with the Agency's Ground-Water Protection Strategy published in August 1984, that meet the following three conditions: (1) they are within the controlled area or near (less than five kilometers beyond) the controlled area; (2) they are supplying drinking water for thousands of persons as of the date that the Department selects the site for extensive exploration as a potential location of a disposal system; and (3) they are irreplaceable in that no reasonable alternative source of drinking water is available to that population.

For such Class I ground waters, Section 191.16 limits the radionuclide concentrations in water withdrawn from any portion of them to no more than concentration limits similar to those established for the output of community water systems in 40 CFR 141. However, if the preexisting concentrations of radioactivity in the Class I aquifer already exceed any of those limits at a particular site, Section 191.16 then limits any increases in the preexisting concentrations to these same concentration limits. The Agency believes these provisions are necessary and adequate to avoid any significant degradation of the important drinking water resources provided by these Class I ground waters.

Alternative Provisions for Disposal (Section 191.17)

In developing the disposal standards, the Agency has had to make many assumptions about the characteristics of disposal systems that have not been built, about plans for disposal that are only now being formulated, and about the probable adequacy of technical information that will not be collected for many years. Thus, although the Agency believes that the disposal standards being promulgated today are appropriate based upon current knowledge, we cannot rule out the possibility that future information may indicate needs to modify the standards.

In recognition of this possibility, Section 191.17 of the final rule sets forth procedures under which the Administrator may develop modifications to Subpart B, should the need arise. Any such changes would have to proceed through the usual notice-and-comment rulemaking process, and Section 191.17 stipulates that such a rulemaking would require a public comment period of at least 90 days, to include public hearings in affected areas of the country. Although such procedures are common practice in rulemakings of this type, they are not required by the statutes relevant to this rule (Administrative Procedures Act mandates can be satisfied by a comment period as short as 14 days). Thus, Section 191.17 insures an opportunity for significant public interaction regarding any proposed changes to the disposal standards.

There are several areas of uncertainty the Agency is aware of that might cause suggested modifications of the standards in the future. One of these concerns implementation of the containment requirements for mined geologic repositories. This will require collection of a great deal of data during site characterization, resolution of the inevitable uncertainties in such information, and adaptation of this information into probabilistic risk assessments. Although the Agency is currently confident that this will be successfully accomplished, such projections over thousands of years to determine compliance with an environmental regulation are unprecedented. If—after substantial experience with these analyses is acquired—disposal systems that clearly provide good isolation cannot reasonably be shown to comply with the containment requirements, the Agency would consider whether modifications to Subpart B were appropriate.

Another situation that might lead to suggested revisions would be if additional information were developed regarding the disposal of certain wastes that appeared to make it inappropriate to retain generally applicable standards addressing all of the wastes covered by this rule. For example, the DOE is considering disposal of some defense wastes by stabilizing them in their current storage tanks, rather than relocating them to a mined repository. The Agency has not assessed the ramifications of such disposal yet, and it is certainly possible that it could be carried out in compliance with all the provisions of Subpart B being promulgated today. However, it is also possible that there may be benefits associated with such disposal that would warrant changes in Subpart B for these types of waste. If so, Section 191.17 would govern the consideration of any such revisions.

Other examples of developments that might offer reasons to consider alternative provisions in the future include: the use of reactor fuel cycles or utilizations substantially different than today's; new models of the environmental transport and biological effects of radionuclides that indicate major changes (i.e., approaching an order of magnitude) in the relative risks associated with different radionuclides and the level of protection sought by the disposal standards; or information that indicates that particular assurance requirements might not be needed in certain situations to insure adequate confidence of long-term environmental protection.

Guidance for Implementation (Appendix B)

This supplement to the final rule is based upon some of the analytical assumptions that the Agency made in developing the technical basis used for formulating the numerical disposal standards. These analytical assumptions incorporate information assembled as part of the technical basis used to develop the proposed rule. In particular, Appendix B discusses: (1) the consideration of all barriers of a disposal system in performance assessments; (2) reasonable limitations on the scope of performance assessments; (3) the use of average or "mean" values in expressing the results of performance assessments; (4) the types of assumptions regarding the effectiveness of institutional controls; and (5) limiting assumptions regarding the frequency and severity of inadvertent human intrusion into geologic repositories.

The implementing agencies are responsible for selecting the specific information to be used in these and other aspects of performance assessments to determine compliance with 40 CFR 191. However, the Agency believes it is important that the assumptions used by the implementing agencies are compatible with those used by EPA in developing this rule. Otherwise, implementation of the disposal standards may have effects quite different than those anticipated by EPA. The final rule to be published in the Code of Federal Regulations will include this informational appendix as guidance to the implementing agencies. Although the other agencies are not bound to follow this guidance, EPA recommends that it be carefully considered in planning for the application of 40 CFR 191. The Agency will monitor implementation of the disposal standards as it develops over the next several years to determine whether any changes to the rule are called for to meet the Agency's objectives for these standards.

COMMENTS ON ISSUES HIGHLIGHTED FOR PUBLIC REVIEW

The Agency particularly requested public comment on six issues associated with the proposed rule (47 FR 58196). After these comments were received, additional comments and information were requested on seven issues raised by the initial comments (48 FR 21666). Two of these seven issues (the definition of high-level waste and the use of individual dose limitations in the disposal standards) had been included among the first six issues that were highlighted. Thus, a total of eleven questions received particular attention during the public review and comment process. The following paragraphs summarize the comments received on each of these issues and the Agency's responses to them, including descriptions of any resulting changes made in the final rule.

Definition of "High-Level Waste"

Traditionally, the term "high-level waste" has meant the highly radioactive liquid wastes remaining from the recovery of uranium and plutonium in a nuclear fuel reprocessing plant, and other liquid or solid forms into which such liquid wastes are converted to facilitate managing them. This traditional use of the term has not included radioactive materials from other sources, no matter how radioactive they are. However, somewhat different definitions of high-level waste have appeared in certain laws and regulations affecting specific aspects of radioactive waste management. Most notably, some of these definitions have included unreprocessed spent fuel as the prospects for a commercial fuel reprocessing industry became more uncertain.

In the proposed rule, high-level waste was defined in the traditional sense, including spent fuel if disposed of without reprocessing. But the proposed definition also included minimum radioactivity concentrations below which such materials would not be subject to the stringent isolation requirements of 40 CFR 191. To identify these minimum concentrations, the maximum concentrations that the NRC determined that it would generally accept in near-surface disposal facilities under 10 CFR Part 61 (47 FR 57446) were adapted. Since this represented a modification of the traditional meaning of high-level waste, the Agency particularly sought comment on this aspect of the proposed rule.

Shortly after 40 CFR 191 was published for public review, the NWPA was enacted. The NWPA distinguished between spent nuclear fuel and high-level waste, and it defined high-level waste to include both: "(A) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation." This definition allows for inclusion of highly radioactive material not related to reprocessing of spent nuclear fuel, and it reflects the concept that some derivatives of nuclear fuel reprocessing may not contain sufficient radioactivity to warrant exceptional isolation.

Many of the comments regarding the proposed definition suggested that EPA adopt the definition in the NWPA, although in response to the specific questions distributed in conjunction with the Agency's public hearings, many responders thought that the Agency should define the phrase "sufficient concentrations" contained in part A of the NWPA definition. However, several commenters argued that the proposed lower limits for high-level waste concentrations had been improperly taken out of the context of 10 CFR 61 and could require expensive disposal of wastes with relatively small hazards.

After considering these comments and other information currently available, the Agency decided to incorporate the NWPA definition of high-level waste in the final 40 CFR 191 without further elaboration of the phrase "sufficient concentrations." The Agency recognizes that this introduces some uncertainty regarding the applicability of this rule. However, the Commission is now beginning a rulemaking that should assemble the technical information needed to develop a more specific definition of high-level wastes. Since the NRC definition would not necessarily apply to all the situations covered by 40 CFR 191 (e.g., management and storage of defense high-level wastes prior to disposal is not regulated by NRC), the Agency will follow the Commission's rulemaking to determine what appropriate elaborations of the NWPA definition should be incorporated into 40 CFR 191. Upon completion of the NRC rulemaking, the Agency will initiate steps to appropriately modify this rule. In addition, EPA will address disposal of any radioactive wastes that are not covered by 40 CFR 191 or 40 CFR 192 (the Agency's standards for disposal of uranium mill tailings) as it considers standards for disposal of low-level radioactive wastes (48 FR 39563).

Finally, incorporating the NWPA definition of high-level waste also includes the phrase "consistent with existing law" when describing the NRC's responsibilities to identify materials as high-level waste. Promulgation of 40 CFR 191 with this definition does not signify Agency acceptance or endorsement of any particular interpretation of the phrase "consistent with existing law." The Agency presumes that the Commission will specify the applicability of its existing authorities as it conducts the relevant rulemaking efforts.

The Level of Protection

In the proposed rule, the containment requirements for disposal systems limited the residual risks to no more than an estimated 1,000 premature cancer deaths over the first 10,000 years after disposal of the wastes from 100,000 metric tons of heavy metal (MTHM) used as fuel in a nuclear reactor. The Agency pointed out that a variety of mined repository designs using different combinations of geologic media and engineered controls were expected to meet these requirements. It was also estimated that the residual risks to future generations appeared to be no greater than if the uranium ore used to create the wastes had not been mined. EPA particularly asked for comment on whether it had taken an appropriate and reasonable approach in choosing this level of protection based upon these considerations.

Most of the public comments found this approach satisfactory. However, some commenters argued that the risks from unmined uranium ore did not necessarily define an acceptably low level of residual risks. They pointed out that such risks may vary from place to place (and a high-level waste repository could "redistribute" them) and that society sometimes does take measures to clean-up naturally-occurring radioactivity, implying that such natural risks are not always "acceptable."

On the other hand, some commenters felt that the level of protection sought in the proposed rule was far too stringent when compared to risks allowed and accepted by society from other activities. For example, the SAB Subcommittee recommended that the desired level of protection be relaxed by at least a factor of ten for this reason, coupled with the Subcommittee's concern that the uncertainties in analytical projections over thousands of years could make it difficult to demonstrate compliance with the proposed containment requirements.

After evaluating the public comments and updated performance assessments of geologic repositories, the Agency has retained the proposed level of protection as the basis for the long-term containment requirements in the final rule—even though it is true that long-term assessments of repository performance will encounter substantial uncertainties, as the SAB Subcommittee pointed out. Three reasons support this decision.

First, revising the performance assessments in accordance with many of the technical recommendations of the SAB has reinforced the Agency's conclusion that the proposed level of protection can reasonably be achieved by a variety of combinations of repository sites and designs—and EPA's regulatory impact analyses indicate that this level of protection can be achieved without significant effects on the cost of disposing of these wastes.

Second, comparing this level of protection with the comparable risks from equivalent amounts of unmined uranium ore continues to reinforce the Agency's belief that this is an acceptably small residual risk for future generations. Therefore, the Agency believes that this level of protection represents a reasonable basis for these disposal standards.

Third, rather than relax the level of protection, the Agency has chosen to address the uncertainties that concerned the SAB Subcommittee by adding Section 191.13(b) and by providing a more detailed "Guidance for Implementation" section to replace the proposed "Procedural Requirements." For example, this guidance points out that the entire range of possible projections of releases need not meet the containment requirements. Rather, compliance should be based upon the projections that the implementing agencies believe are more realistic. Furthermore, this revisions acknowledge that the quantitative calculations needed may have to be supplemented by reasonable qualitative judgments in order to appropriately determine compliance with the disposal standards.

In retaining the proposed level of protection, the Agency emphasizes that it is making a decision applicable only to the circumstances involving disposal of spent nuclear fuel and high-level and transuranic wastes. This rule cannot be used to establish precedents such as "no incremental risk to future generations" for extrapolation to other disposal problems. For other situations, evaluations of technological feasibility and cost-effectiveness must be considered for the particular set of circumstances. If mined geologic repositories were not capable of providing such good protection, the Agency might have chosen considerably different standards.

Time Period for Containment Requirements

Many commenters addressed the 10,000-year period used for the proposed containment requirements. A few argued that this period was too long and that EPA should only be concerned with a few hundred to a thousand years. A number of commenters supported the focus on 10,000 years. However, many commenters felt that it was inappropriate for the standards to ignore the period after 10,000 years. Some suggested that the containment requirements should address periods ranging from 50,000 to 500,000 years.

In the proposed rule, the Agency indicated that 10,000 years was chosen, in part, because compliance with quantitative standards for a substantially longer period would have entailed considerably more uncertain calculations. There was no intention to indicate that times beyond 10,000 years were unimportant, but the Agency felt that a disposal system capable of meeting the proposed containment requirements for 10,000 years would continue to protect people and the environment well beyond 10,000 years. The SAB Subcommittee reviewed and supported these technical arguments for limiting the containment requirements to a 10,000-year period. Those commenters who argued for longer periods did not suggest effective ways that might compensate for the substantially greater uncertainties inherent in longer projections of disposal system performance.

However, many of the commenters and the SAB Subcommittee suggested that more qualitative or comparative assessments beyond 10,000 years might be appropriate. The Agency agreed with these comments and worked with the DOE to formulate comparative assessment provisions that have been incorporated into the final version of the Department's site selection guidelines

(10 CFR 960). These provisions call for comparisons of the projected releases from undisturbed performance of alternative repository sites over 100,000 years to be a significant consideration in site selection. Since natural barriers are expected to provide the primary protection for such long time frames, this provision should allow for appropriate consideration of longer time periods without requiring the absolute values of these very uncertain calculations to meet a specific quantitative test. With the inclusion of this comparative test in 10 CFR 960, the Agency believes that no modification is needed in 40 CFR 191.

Use of Quantitative Probabilities in the Containment Requirements

The containment requirements in the proposed rule applied to two categories of potential releases ("reasonably foreseeable" and "very unlikely") based upon their projected probabilities of occurrence over the first 10,000 years after disposal. In its comments on the proposed rule, the NRC objected to the proposed quantitative definitions of these probabilities on the basis that calculation of such probabilities could be so uncertain that it would be impractical to determine whether the standards had been complied with. Instead, the NRC suggested substitution of qualitative terms to identify the two categories of potential releases. The wording proposed by the NRC was formulated in terms of releases that might be caused by geologic processes and events.

In the second round of comment, the Agency sought information on whether to adopt the NRC's recommended wording or to retain definitions based on quantitative probabilities. Although a number of commenters agreed with the NRC position, the preponderance of comments supported retention of the quantitative probabilities. The SAB Subcommittee strongly supported retention of the probabilistic structure, but with substantially less restrictive probabilities and with the proviso that the Agency be sure that such conditions would be "... practical to meet and [would] not lead to serious impediments, legal or otherwise, to the licensing of high-level waste repositories." After considering all of this information, the Agency has revised the structure of the containment requirements in several ways that will retain quantitative objectives for long-term containment while allowing the implementing agencies enough flexibility to make qualitative judgments when necessary.

First, the final rule does not use the terms "reasonably foreseeable" and "very unlikely" releases. Instead, the permissible probabilities for two different levels of cumulative releases (over 10,000 years after disposal) are now incorporated directly into the containment requirements.

Second, the numerical probabilities associated with the two release categories have been increased by an order of magnitude to reflect further assessments of the uncertainties associated with projecting the probabilities of geologic events such as fault movement.

Third, the final rule clearly indicates that comprehensive performance assessments, including estimates of the probabilities of various potential releases whenever meaningful estimates are practicable, are needed to determine compliance with the containment requirements.

Fourth, a paragraph has been added to the final containment requirements (Section 191.13) to emphasize that unequivocal proof of compliance is neither expected nor required because of the substantial uncertainties inherent in such long-term projections. Instead, the appropriate test is a reasonable expectation of compliance based upon practically obtainable information and analysis. This paragraph was patterned after a paragraph that considered similar issues in NRC's 10 CFR 60.

Finally, the "Guidance for Implementation" section has been added (Appendix B). This part of the rule describes the Agency's assumptions regarding performance assessments and uncertainties and should discourage overly restrictive or inappropriate implementation of the containment requirements.

The Agency believes that these revisions to the proposed rule preserve an objective framework for application of the containment requirements that requires very stringent isolation while allowing the implementing agencies adequate flexibility to handle specific uncertainties that may be encountered.

Within this framework, the possibility of inadvertent human intrusion into or nearby a repository requires special attention. Such intrusion can significantly disrupt the containment afforded by a geologic repository (as well as being dangerous for the intruders), and repositories should be selected and designed to reduce the risks from such potential disruptions. However, assessing the ways and the reasons that people might explore underground in the future—and evaluating the effectiveness of passive controls to deter such exploration near a repository—will entail informed judgment and speculation. It will not be possible to develop a "correct" estimate of the probability of such intrusion. The Agency believes that performance assessments should consider the possibilities of such intrusion, but that limits should be placed on the severity of the assumptions used to make the assessments. Appendix B to the final rule describes a set of parameters about the likelihood and consequences of inadvertent intrusion that the Agency assumed were the most pessimistic that would be reasonable in making performance assessments. The implementing agencies may adopt these assumptions or develop similar ones of their own. However, as indicated under the discussion of institutional controls, the Agency does not believe that institutional controls can be relied upon to completely eliminate the possibility of inadvertent intrusion.

Definition of "Accessible Environment"

The containment requirements limit releases to the "accessible environment" for 10,000 years after disposal. In the proposed rule, ground water within 10 kilometers of a disposal system was excluded from the definition of accessible environment. This definition was intended to reflect the concept that the geologic media surrounding a mined repository are part of the long-term containment system, with disposal sites being selected so that the surrounding media prevent or retard transport of radionuclides through ground water. Such surrounding media would be dedicated for this purpose, with the intention to prohibit incompatible activities (either those that might disrupt the disposal system or those that could cause significant radiation exposures) in perpetuity. Applying standards to the ground water contained within these geologic media surrounding a repository would ignore the role of this natural barrier, and it could reduce the incentive to search for sites with characteristics that would enhance long-term containment of these wastes. (At the same time, the Agency recognized that the institutional controls designed to reserve this area around a disposal system cannot be considered infallible, and other provisions of the rule are designed to reduce the consequences of potential failures.)

Many commenters objected to the definition of accessible environment incorporated in the proposed rule. Some recommended that all ground water, or all "potable" ground water, should be included. Others agreed that it was appropriate to exclude some ground water in the immediate vicinity of a repository, but argued that the proposed 10-kilometer distance was too long—particularly for ground water sources that were likely to be used in the future. A few commenters thought that the proposed definition was too restrictive by including all ground water beyond 10 kilometers; they suggested that poor quality ground water sources unlikely to be used in the future should not be part of the accessible environment at all.

After considering these comments, the Agency has decided to make several changes in the definition of the "accessible environment." First, the concept of a "controlled area" has been adopted from NRC's 10 CFR 60. This establishes an area around a disposal system that is to be identified by markers, records, and other passive institutional controls intended to prohibit incompatible activities from the area. Consistent with the proposed 40 CFR 191, the current NRC definition of "controlled area" limits its distance from the edge of a repository to no more than 10 kilometers. The final 40 CFR 191 defines "accessible environment" to include: (1) the atmosphere, land surfaces, surface waters, and the oceans, wherever they are located; and (2) portions of the lithosphere—and the ground water within it—that are beyond the controlled area.

Second, the Agency has made the definition of the "controlled area" more restrictive than that currently incorporated in 10 CFR 60. This revised definition limits the controlled area to a distance no greater than five kilometers from the orginal emplacement of wastes in a disposal system, rather than 10 kilometers. Furthermore, the revised definition limits the area encompassed by the controlled area to no more than 100 square kilometers, which is approximately the area that would be encompassed by a controlled area at a distance of three kilometers from all sides of a typical repository configuration. (A distance of five kilometers from all sides of a typical repository would correspond to an area of about 200 square kilometers, whereas a distance of ten kilometers from all sides corresponds to an area of almost 500 square kilometers.) This revised definition substantially reduces the area of the lithosphere that would have been removed from the "accessible environment" defined in the proposed rule, and it somewhat reduces the distance used in the proposed rule. The five kilometer distance was chosen to retain reasonable compatibility with the NRC's requirement for a preemplacement ground water travel time of 1,000 years to the accessible environment (one of the 10 CFR 60 requirements developed in concert with the proposed rule), while still providing for greater isolation than called for by the proposed rule. This definition of the accessible environment will allow a controlled area to be established asymmetrically around a repository based upon the particular characteristics of a site.

Release Limits vs. Individual Dose Limits

The Agency believes that the containment requirements in Section 191.13 will insure that the overall population risks to future generations from disposal of these wastes will be acceptably small. However, the situation with regard to potential individual doses is more complicated. Even with good engineering controls, some waste may eventually (i.e., several hundreds or thousands of years after disposal) be released into any ground water that might be in the immediate vicinity of a geologic repository. Since ground water generally provides relatively little dilution, anyone using such contaminated ground water in the future may receive a substantial radiation exposure (e.g., several rem per year or more). This possibility is inherent in collecting a very large amount of radioactivity in a small area.

The proposed rule did not contain any numerical restrictions on such potential individual doses after disposal. Rather, the proposal relied on several of the qualitative assurance requirements to greatly reduce the likelihood of such exposures. In particular, the assurance requirement calling for extensive permanent markers and records was intended to perpetuate information to future generations about the dangers of intruding into the vicinity of a repository. The assurance requirement to avoid sites with significant resources was intended to reduce the incentive to explore around a repository even if the information passed on was ignored or misunderstood. And the assurance requirements to use multiple barriers, both engineered and natural, and to keep releases as small as reasonably achievable were intended to encourage reduction of releases to ground water beyond that needed to meet the containment requirements—further reducing the potential for harmful individual exposures.

This approach to potential individual exposures was highlighted for comment when 40 CFR 191 was proposed. After receiving many recommendations to incorporate a limitation on individual doses after disposal, the Agency sought comment on further details of such a limitation in the second round of comments. For example, EPA asked whether such a limitation should apply to ground water use, whether it should apply only for ground water at some distance from a geologic repository or for any ground water source, and whether reliance on existing individual dose limitations (such as 40 CFR 141 or 10 CFR 20) for protection regarding ground water would be adequate.

The responses resulting from these questions offered a wide range of suggestions. A number of commenters opposed inclusion of an individual dose limitation for disposal on the grounds that calculations to judge compliance with such a standard would be highly speculative and not an appropriate basis upon which to judge the adequacy of a disposal system. In contrast, some other commenters argued that an individual dose standard in the 5 to 25 millirem per year range should apply to use of ground water in the accessible environment for an indefinitely long period into the future. Another group of commenters supported inclusion of some limitation on individual exposure, but only to the extent that it would not compromise the primary intent of long-term isolation and containment of the wastes.

These comments did not offer information that changed the Agency's perception of some of the problems associated with individual dose limitations for disposal. First, relying only upon an individual dose standard for disposal could encourage disposal methods that would enhance dilution of any wastes released. Thus, disposal sites near bodies of surface water or large sources of ground water might be preferred—which the Agency believes is an inappropriate policy that would usually increase overall population exposures.

This concern could be met by adding an individual dose limitation to the proposed containment requirements, rather than replacing them. However, the Agency's performance assessments of geologic repositories indicate that doses from using ground water close to a repository can become substantial (e.g, several rem per year) after a few hundred or thousand years, because the geological and geochemical characteristics of appropriate sites tend to concentrate eventual releases of wastes in any ground water that is close to the site. A study published by the National Academy of Sciences in April 1983 confirms this potential for large individual doses if flowing ground water can contact the wastes after the waste cansiters are presumed to start leaking. Although it might be possible to find certain geologic settings that avoid this problem, such restrictive siting prerequisites could substantially delay development of disposal systems without providing significantly more protection to populations. Furthermore, even if reasonable limitations on individual exposure might be met at certain sites for very long times, demonstrating compliance with such limitations could be very difficult because of the additional complexities involved in estimating individual exposures rather than amounts of radioactivity released. The SAB Subcommittee report generally agreed with the technical aspects of these conclusions.

On the other hand, analyses of repository systems with good engineering controls show that they should be able to prevent significant doses from ground water use for at least a thousand years after disposal. Such protection would be compatible with both the proposed containment and assurance requirements. Accordingly, the SAB Subcommittee recommended that the Agency include a requirement limiting individual doses for the first 500 years after disposal, and one of the States that commented on the proposed rule suggested an individual dose limit for 1,000 years after disposal.

After considering all of this information, the Agency has decided to include two new sections in the final rule. The first (Section 191.15) limits exposures to members of the public after disposal, while the second (Section 191.16) limits concentrations in water withdrawn from certain important sources of ground water after disposal.

The individual protection requirements in Section 191.15 limit exposures from a disposal system to individuals in the accessible environment to 25 millirem per year to the whole body and 75 millirem per year to any organ. These limits apply only to undisturbed performance of the disposal system (i.e., without any consideration of human intrusion or disruption by unlikely natural events), and they apply for the first 1,000 years after disposal. All potential pathways of radiation or radioactive material from the disposal system to people (associated with undisturbed performance) shall be considered, including the assumption that an individual drinks two liters per day of water from any "significant source of ground water" outside of the "controlled area" surrounding a disposal system. If the implementing agency plans to allow individuals to use ground water within the controlled area, such planned use would also have to be considered within the pathways evaluated to determine compliance with Section 191.15.

"Significant sources of ground water" are defined to include any aquifer currently providing the primary source of water for a community water system or any aquifer that satisfies all of the following five conditions: (1) it is saturated with water containing less than 10,000 milligrams per liter of total dissolved solids; (2) it is within 2,500 feet of the land surface; (3) it has a transmissivity of at least 200 gallons per day per foot, provided that (4) each of the underground formations or parts of underground formations included within the aquifer must have an individual hydraulic conductivity greater than 2 gallons per day per square foot; and (5) it must be capable of providing a sustained yield of 10,000 gallons per day of water to a pumped or flowing well.

Although such quantitative distinctions are inevitably somewhat arbitrary, the Agency believes that they provide reasonable demarcations to identify underground formations that could meet the needs of community water systems in the future. The selected transmissivity of 200 gallons per day per foot and the sustained yield of 10,000 gallons per day roughly correspond to the size of a ground water source required to support the needs of about 20 households; this is similar to the size of the community water system considered in 40 CFR 141. The water quality criterion of 10,000 milligrams per liter of total dissolved solids has been used in several previous Agency regulations and is based upon Congressional guidance in the legislative history of the Safe Drinking Water Act. The maximum depth criterion of 2,500 feet was chosen because almost all of the wells used to provide water to significant numbers of people do not extend below this depth. The minimum hydraulic conductivity criterion of 2 gallons per day per square foot was chosen to insure that only reasonably permeable formations are considered, rather than including unproductive formations that might be in the vicinity of a "significant source of ground water."

The ground water protection requirements in Section 191.16(a) limit the concentrations in water withdrawn from any "special source of ground water" in the vicinity of a disposal system to concentrations similar to those established for the output of community water systems by 40 CFR 141: (1) 5 picocuries per liter of radium-226 and radium-228; (2) 15 picocuries per liter of alpha-emitting radionuclides (including radium-226 and radium-228 but excluding radon); or (3) the combined concentrations of radionuclides that emit either beta or gamma radiation that would produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem per year if an individual continuously consumed 2 liters per day of drinking water from that source of water. However, if the preexisting radionuclide concentrations in the special source of ground water already exceed any of these limits, then Section 191.16(b) limits any increases in the preexisting concentrations to the concentration limits set in 191.16(a). Like the individual protection requirements, the ground water protection requirements apply only for undisturbed performance of the disposal system and apply for the first 1,000 years after disposal. Unlike the individual protection requirements, the ground water requirements would apply to a "special source" if it was within the controlled area.

"Special sources" are defined to include only those Class I ground waters—to be identified in accordance with the Agency's Ground-Water Protection Strategy published in August 1984—that meet the following three conditions: (1) they are within the controlled area or near (less than five kilometers beyond) the controlled area; (2) they are supplying drinking water for thousands of persons as of the date that the Department selects the site for extensive exploration as a potential location of a disposal system; and (3) they are irreplaceable in that no reasonable alternative source of drinking water is available to that population.

Need for the Assurance Requirements

The preceding issues dealt with the quantitative requirements of the disposal standards. While numerical standards are important to bring about appropriate selection and design of disposal systems, the Agency has long recognized that the numerical standards chosen for Subpart B, by themselves, do not provide either an adequate context for environmental protection or a sufficient basis to foster public confidence in the national program. There are too many uncertainties in projecting the behavior of natural and engineered components for many thousands of years—and too many opportunities for mistakes or poor judgments in such calculations—for the numerical requirements on overall system performance in Subpart B to be the sole basis to determine the acceptability of disposal systems for these very hazardous wastes. These uncertainties and potential errors in quantitative analysis could ultimately prevent the degree of protection sought by the Agency from being achieved. (Theoretically, it might be possible to develop adequate confidence in achieving this level of protection by choosing much more stringent numerical standards, but this could lead to substantial difficulties in implementation.) Therefore, the proposed standards also included qualitative assurance requirements chosen to ensure that cautious steps are taken to reduce the problems caused by these uncertainties. The proposed rule emphasized that the assurance requirements were an essential complement to the quantitative containment requirements that were selected.

In its comments on the proposed rule, the NRC argued that the assurance requirements were not properly part of the Agency's generally applicable standards. The Commission agreed that the overall numerical performance standards were not sufficient, but suggested that its regulations and procedures were the appropriate vehicle to provide the necessary confidence that the inherent uncertainties would not compromise environmental protection. The Agency believes that it does have the authority to give regulatory expression to the context within which it has chosen to establish one set of numerical standards rather than another. However, because it might not be appropriate to exercise this authority, the Agency sought public comment on the need for the assurance requirements in the second round of comments.

The preponderance of comments received on this question strongly supported retention of the assurance requirements in 40 CFR 191.
In particular, virtually all of the various State governments that commented on the rule described the assurance requirements as an essential part of the regulations governing disposal of these wastes. Subsequently, two of these States, Nevada and Minnesota, petitioned the Commission to incorporate the assurance requirements proposed as part of 40 CFR 191 into its own rules (50 FR 18267).

Based upon these comments, the Agency and the NRC have reached an agreement that should accomplish the desired regulatory goals while avoiding the jurisdictional issue. EPA has included the assurance requirements in the final rule, modified as appropriate in response to other comments. However, these requirements will not be applicable to disposal facilities to be licensed by the Commission. Instead, as discussed previously, the NRC staff plans to propose modifications to 10 CFR 60, developed in consultation with EPA, for public review and comment within approximately 120 days to insure that the objectives of all of the assurance requirements in 40 CFR 191 will be accomplished through compliance with 10 CFR 60. The Agency has provided the Commission with all of the comments received by EPA regarding the assurance requirements, so that the NRC can use them in its rulemaking. In addition, the Agency will participate in the NRC rulemaking to facilitate incorporation of the principles of all of the assurance requirements in Federal regulation. Finally, the Agency will review the record and outcome of the Part 60 rulemaking to determine if any subsequent modifications to 40 CFR 191 are needed.

Approach Towards Institutional Controls

The Agency particularly sought comment on its proposed approach to reliance on institutional controls. The proposed rule limited reliance on "active institutional controls" (such as controlling access to a disposal site, performing maintenance operations, or cleaning up releases) to a reasonable period of time after disposal, described as on the order of a "few hundred years." On the other hand, "passive institutional controls" (such as permanent markers, records, archives, and other methods of preserving knowledge) were considered to be at least partially effective for a longer period of time.

Few commenters argued with the distinction between active and passive institutional controls, or with the amount of reliance the proposed rule envisioned for passive controls. However, many commenters felt that "a few hundred years" was too long a period to count on active controls. Accordingly, the final rule limits reliance on active institutional controls to no more than 100 years after disposal. This was the time period the Agency considered in criteria for radioactive waste disposal that were proposed for public comment in 1978 (43 FR 53262), a period that was generally supported by the commenters on that proposal. After this time, no contribution from any of the active institutional controls can be projected to prevent or limit potential releases of waste from a disposal system.

The concept of passive institutional controls has now been incorporated into the definition of "controlled area" that is used to establish one of the boundaries for applicability of the containment requirements and the individual protection requirements in the final rule. Because the assumptions made about the effectiveness of passive institutional controls can strongly affect implementation of the containment requirements, the Agency's intent has been elaborated in the "guidance for implementation" section. The Federal Government is committed to retaining control over disposal sites for these wastes as long as possible. Accordingly (and in compliance with one of the assurance requirements), an extensive system of explanatory markers and records will be instituted to warn future generations about the location and dangers of these wastes. These passive controls have not been assumed to prevent all possibilities of inadvertent human intrusion, because there will always be a realistic chance that some individuals will overlook or misunderstand the markers and records. (For example, exploratory drilling operations occasionally intrude into areas that clearly would have been avoided if existing information had been obtained and properly evaluated.) However, the Agency assumed that society in general will retain knowledge about these wastes and that future societies should be able to deter systematic or persistent exploitation of a disposal site.

The Agency also assumed that passive institutional controls should reduce the chance of inadvertent intrusion compared to the likelihood if no markers and records were in place. Specific judgments about the chances and consequences of intrusion should be made by the implementing agencies when more information about particular disposal sites and passive control systems is available. The parameters described in the "guidance for implementation" represent the most severe assumptions that the Agency believed were reasonable to use in its analyses to evaluate the feasibility of compliance with this rule (analyses that are summarized in the BID). The implementing agencies are free to use other assumptions if they develop information considered adequate to support those judgments.

The role envisioned for institutional controls in this rulemaking has been adapted from the general approach the Agency has followed in its activities involving disposal of radioactive wastes since the initial public workshops conducted in 1977 and 1978. The Agency's overall objective has been to protect public health and the environment from disposal of radioactive wastes without relying upon institutional controls for extended periods of time—because such controls do not appear to be reliable enough over the very long periods that these wastes remain dangerous. Instead, the Agency has pursued standards that call for isolation of the wastes through the physical characteristics of disposal system siting and design, rather than through continuing maintenance and surveillance. This principle was enunciated in the general criteria published for public comment in 1978 (43 FR 53262), and it has been incorporated into the Agency's standards for disposal of uranium mill tailings (48 FR 590, 48 FR 45926).

This approach has been tailored to fit two circumstances associated with mined geologic repositories. First, 40 CFR 191 places containment requirements on a broad range of potential unplanned releases as well as the expected behavior of the disposal system. Therefore, determining compliance with the standards involves performance assessments that consider the probabilities and consequences of a variety of disruptive events, including potential human intrusion. Not allowing passive institutional controls to be taken into account to some degree when estimating the consequences of inadvertent human intrusion could lead to less protective geologic media being selected for repository sites. The Agency's analyses indicate that repositories in salt formations have particularly good capabilities to isolate the wastes from flowing ground water and, hence, the accessible environment. However, salt formations are also relatively easy to mine and are often associated with other types of resources. If performance assessments had to assume that future societies had no way to ever recognize and limit the consequences of inadvertent intrusion (from solution mining of salt, for example), the scenarios that would have to be studied would be more likely to eliminate salt media from consideration than other rock types. Yet, this could rule out repositories that may provide the best isolation, compared to other alternatives, if less pessimistic assumptions about survival of knowledge were made.

The second circumstance that the Agency considered in evaluating the approach towards institutional controls taken in this rule is the fact that the mined geologic repositories planned for disposal of the materials covered by 40 CFR 191 are different from the disposal systems envisioned for any other types of waste. The types of inadvertent human activities that could lead to significant radiation exposures or releases of material from geologic repositories appear to call for much more intensive and organized effort than those which could cause problems at, for example, an unattended surface disposal site. It appears reasonable to assume that information regarding the disposal system is more likely to reach (and presumably deter) people undertaking such organized efforts than it is to inform individuals involved in mundane activities.

These considerations led the Agency to conclude that a limited role for passive institutional controls would be appropriate when projecting the long-term performance of mined geologic repositories to judge compliance with these standards. However, such assumptions would not necessarily be applicable to other Agency actions where different issues are involved.

Avoiding Sites with Natural Resources

The proposed rule contained an assurance requirement that would have prohibited use of sites where there is a reasonable expectation that future exploration for scarce or easily accessible resources might occur. The comments received on this issue generally agreed that sites with resources should be avoided. However, some commenters suggested that the requirement should be more restrictive, to include "potentially accessible" resources. Other commenters argued that the Agency should be less restrictive regarding sites with possible resource potential—discouraging but not prohibiting their use—because other attributes of the site might overcome the relative disadvantages presented by resource potential.

After considering these comments, the Agency agreed with the latter viewpoint. This judgment was reinforced by the belief that disposal sites should be chosen after comparative evaluation of a variety of alternatives, and the proposed assurance requirement could have inhibited this process. Therefore, this assurance requirement has been revised in the final rule to identify resource potential as a disincentive but not as an outright prohibition for site selection. Instead, the revised assurance requirement states that places with resource potential shall not be used "unless the favorable characteristics of such places compensate for their greater likelihood of being disturbed in the future."

This wording implies a qualitative comparison, because the Agency is not aware of quantitative formulas comprehensive enough to provide adequate comparisons to govern site selection. However, the Agency does not intend that sites with resource potential can be used merely upon identification of a few features that might be more favorable than at a site without significant resources. Rather, sites with resources should only be used if it is reasonably certain that they would provide better overall protection than the practical alternatives that are available.

The following example illustrates the effect of the change in this assurance requirement. When discussing the proposed assurance requirement, the Agency implied that disposal in salt domes might not be acceptable because such formations seemed more likely than others to attract exploration in the future. The modification of this assurance requirement in the final rule means that salt domes should not be peremptorily removed from consideration, but should be compared against all of the characteristics of alternative sites in terms of the overall environmental protection expected.

Long-Term Monitoring

The proposed rule addressed active institutional controls over a disposal site only in a negative sense—to prohibit reliance upon them for more than a few hundred years after disposal. The Agency's intent was to be sure that long-term protection of the environment did not depend upon positive actions by future generations. Almost all commenters agreed with this intent, although many suggested a shorter period of reliance was appropriate (see the preceding discussion under "Approach Towards Institutional Controls").

However, several commenters (including most of the States) also urged addition of a requirement for long-term monitoring of a repository after disposal. This view did not deny the need to select and design disposal systems without depending upon active controls in the future. However, it broadened this perspective by arguing that a disposal system so designed should still be monitored for a long time after disposal to guard against unexpected failures.

The Agency had not considered this viewpoint in developing the proposed rule. Accordingly, further information on this idea was sought during the "second round" of public comment, and the Agency surveyed the capabilities and expectations of long-term monitoring approaches. Evaluating this information led the Agency to several conclusions:

(1) Perhaps most importantly, the techniques used for monitoring after disposal must not jeopardize the long-term isolation capabilities of the disposal system. Furthermore, plans to conduct monitoring after disposal should never become an excuse to relax the care with which systems to isolate these wastes must be selected, designed, constructed, and operated.

(2) Monitoring for radionuclide releases to the accessible environment is not likely to be productive. Even a poorly performing geologic repository is very unlikely to allow measurable releases to the accessible environment for several hundreds of years or more, particularly in view of the engineered controls needed to comply with 10 CFR 60. A monitoring system based only on detecting radionuclide releases—a system which would almost certainly not be detecting anything for several times the history of the United States—is not likely to be maintained for long enough to be of much use.

(3) Within the above constraints, however, there are likely to be monitoring approaches which may, in a relatively short time, significantly improve confidence that a repository is performing as intended. Two examples are of particular interest. One involves the concept of monitoring ground water sources at a variety of distances for benign tracers intentionally released to the ground water in the repository; this approach can evaluate

the delay involved in ground water movement from the repository to the environment and can serve to validate expectations of the performance expected from the system's natural barriers. Another concept involves monitoring the small uplift of the land surface over the repository in order to validate predictions of the system's thermal behavior. Both of these approaches can be carried out without enhancing pathways for the wastes to escape from the repository.

Based on these conclusions and the public comments on this question, the Agency has included a provision for long-term monitoring after disposal in the assurance requirements of the final rule: "Disposal systems shall be monitored after disposal to detect substantial and detrimental deviations from expected performance. This monitoring shall be done with techniques that do not jeopardize the isolation of the wastes and shall be conducted until there are no significant concerns to be addressed by further monitoring." This new provision is consistent with the overall intent of the assurance requirements: to take prudent and cautious steps necessary to minimize the risks posed by the inherent uncertainties in expectations of the future. Beyond this broad mandate, however, the Agency has not specified the details of a monitoring program. That is properly left to the implementing agencies. Furthermore, the precise objectives of an appropriate monitoring program probably should not be spelled out until much more information is gathered about the characteristics and expected behavior of specific sites and designs.

Ability to Recover Wastes After Disposal

The proposed rule included an assurance requirement that recovery of these wastes be feasible for "a reasonable period of time" after disposal. The Agency specifically sought comment on whether this was a desirable provision, since it would rule out certain disposal concepts, such as deep-well injection of liquid wastes. The comments received were split about evenly between those who thought the provision should be retained and those who thought it was detrimental to the overall rule. Many of those who opposed the requirement argued that it would encourage designing a geologic repository to make retrieving waste relatively easy—which might compromise the isolation capabilities of the repository or which might encourage recovery of the waste to make use of some intrinsic value it might retain (the potential energy content of spent nuclear fuel, for example).

The intent of this provision was not to make recovery of waste easy or cheap, but merely possible in case some future discovery or insight made it clear that the wastes needed to be relocated. EPA reiterates the statement in the preamble to the proposal that any current concept for a mined geologic repository meets this requirement without any additional procedures or design features. For example, there is no intent to require that a repository shaft be kept open to allow future recovery. To meet this assurance requirement, it only need be technologically feasible (assuming current technology levels) to be able to mine the sealed repository and recover the waste—albeit at substantial cost and occupational risk. The Commission's requirements for multiple engineered barriers within a repository (10 CFR 60) adequately address any concerns about the feasibility of recovering wastes from a repository.

Therefore, this provision should not have any effect upon plans for mined geologic repositories. Rather, it is intended to call into question any other disposal concept that might not be so reversible—because the Agency believes that future generations should have options to correct any mistakes that this generation might unintentionally make. Almost all of the commenters agreed with the validity of this objective. Accordingly, the Agency has decided to retain this assurance requirement in the final rule as proposed.

HEALTH IMPACTS OF 40 CFR 191

Waste Management and Storage. Waste management and storage activities conducted in accordance with Subpart A would limit the maximum risk to a member of the public in the general environment to a 5×10^{-4} chance of incurring a premature fatal cancer over a lifetime. Of course, a risk this large would exist only for an individual continuously exposed to the full amount of the dose limits over his or her lifetime. Because the Agency believes that such continuous exposure is very unlikely, the actual risks to individuals are expected to be much lower. It is theoretically possible under the final rule that an individual could be exposed to 25 millirem per year (to the whole body) from both an NRC-licensed facility and a DOE facility not licensed by NRC, for a total of 50 millirem/year. However, the Agency believes that this is particularly improbable and does not foresee a significant public health impact from this possibility.

Waste Disposal. A disposal system complying with Subpart B would confine almost all of the radioactive wastes to the immediate vicinity of the repository for a very long time. Because the wastes would be so well isolated from the environment, the Agency is confident that any risks to future populations would be very small. Similarly, risks to most future individuals would also be very small (and effectively zero in almost all cases)—except for the possibility that an individual in the distant future might use ground water from the vicinity of a repository. In this case, there is a chance that such an individual might receive a substantial exposure. The following paragraphs describe the possible health impacts of the residual risks from a disposal system that would be in compliance with 40 CFR 191.

Population Risks: With regard to exposure of populations, the Agency has estimated the potential long-term health risks to future generations from various types of mined geologic repositories using very general models of environmental transport and a linear, nonthreshold dose-effect relationship between radiation exposures and premature deaths from cancer. Food chains, ways of life, and the size and geographical distributions of populations will undoubtedly change over a 10,000-year period. Unlike geological processes, factors such as these cannot be usefully predicted over such long periods of time. Thus, in making these health effects projections, the Agency found it necessary to depend upon very general models of environmental pathways and to assume current population distributions and death rates. The SAB Subcommittee evaluated these models carefully, and, although a number of specific changes were recommended for particular parameters, the Subcommittee endorsed the general approach. As a consequence of using these generalized models, EPA's projections are intended to be used primarily as a tool for comparing the performance of one waste disposal system to another and for comparison of the risks of waste disposal with those of undisturbed ore bodies. The results of these analyses should not be considered a reliable projection of the "real" or absolute number of health effects resulting from compliance with the disposal standards.

These health risk models were used to assess the long-term health risks from several different model repositories containing the wastes from 100,000 MTHM—which could include all existing wastes and the future wastes from all currently operating reactors. The Agency estimates that this quantity of waste, when disposed of in accordance with the proposed standards, would cause no more than 1,000 premature deaths from cancer in the first 10,000 years after disposal: an average of no more than one premature death every 10 years. Most of the model repositories considered had projected population risks at least a factor of ten below this, or about 100 deaths over 10,000 years. The projections for the actual repositories that are constructed are expected to be closer to this lower figure. Any such increase in the number of cancer deaths would be very small compared to today's incidence of cancer, which kills about 350,000 people per year in the United States. Similarly, any such increase would be much less than the approximately 6,000 premature cancer deaths per year that the same linear, non-threshold dose-effect relationship predicts for the nation due to natural background radiation.

Individual Risks: With regard to exposures of individuals, the Agency examined the potential doses to persons who might use ground water from the immediate vicinity of a repository at various times in the future. For these analyses, only the expected, undisturbed performance of a repository was considered (e.g, there was no evaluation of exposures that might occur if a repository was disrupted by movement of a fault). In most of the cases studied, no exposures occurred for more than one thousand years after disposal. After that, these analyses predict that significant exposures (on the order of a few rem per year in the vicinity of the repository over the next several thousand years) may appear for some of the geologic media considered. These projections are similar to those contained in the April 1983 report published by the National Academy of Sciences. The BID contains more detailed descriptions of the Agency's individual dose calculations.

Intergenerational Risk: As described earlier, the Agency has chosen to rely on provisions that limit risks to populations as the primary standards for the long-term performance of disposal systems. Although the projections of the residual population risk are clearly very small, the discontinuity between when the wastes are generated and when the projected health effects manifest themselves made it difficult to determine what level of residual risk should be allowed by these disposal standards. The difficulty arose because most of the benefits derived in the process of waste production fall upon the current generation, while most of the risks fall upon future generations. Thus, a potential problem of intergenerational equity with respect to the distribution of risks and benefits became apparent. This problem is sometimes referred to as the intergenerational risk issue, and it is not unique to the disposal of high-level radioactive wastes. If the Agency tried to insure that these standards fully satisfied a criterion of intergenerational equity with respect to the distribution of risks and benefits, it might appear that no risk be passed on to future generations. This is a condition which the Agency believes cannot be met by disposal technologies foreseeable within this century. However, there is one particular factor which has reinforced EPA's decision about the reasonableness of the risks permitted under the disposal standards. This is the following evaluation of the risks associated with undisturbed uranium ore bodies. Additionally, for the purpose of comparing the risks permitted under the standards to other radiation risks which people are currently exposed to, a brief discussion of the risks from other natural sources of radiation is also included.

Uranium Ore: Most uranium ore in the United States occurs in permeable geologic strata containing flowing ground water. Radionuclides in the ore, particularly uranium and radium, continuously enter this ground water. EPA estimated the potential risks from these undisturbed ore bodies using the same generalized environmental models that were used for releases from a waste repository. The effects associated with the amount of ore needed to produce the high-level wastes that would fill the model geologic repository can vary considerably. Part of this variation corresponds to actual differences from one ore body to another; part can be attributed to uncertainties in the assessment. After revising the population risk models in accordance with the recommendations of the SAB Subcommittee, these estimates of the risks from unmined ore bodies ranged from about 10 to more than 100,000 excess cancer deaths over 10,000 years. Thus, leaving the ore unmined appears to present a risk to future generations comparable to the risks from disposal of the wastes covered by these standards.

Variations in Natural Background: Radionuclides occur naturally in the earth in very large amounts, and are produced in the atmosphere by cosmic radiation. Everyone is exposed to natural background radiation from these natural radionuclides and from direct exposure to cosmic radiation. Individual exposures average about 100 millirem per year, with a range of about 60 to 200 millirem/year. These natural background radiation levels have remained relatively constant for a very long time. According to the same linear, nonthreshold dose effect relationship used in EPA's other analyses, an increase of one millirem per year (about one percent) in natural background in the United States would result in about 60 additional deaths per year, or 600,000 over a 10,000 year period.

Natural Radionuclide Concentrations in Ground Water: One source of this exposure to natural background radiation comes from naturally occurring radionuclides found in ground water. Radium is the most important of the naturally occurring radioactive materials likely to occur in public water supply systems, but uranium is also found in ground waters due to its natural occurrence. Surveys of radionuclides in ground water systems indicate: a United States range of 0.1 to 50 picocuries (pCi) per liter for radium-226 (with isolated sources exceeding 100 pCi/liter); up to 74 pCi/liter for all alpha-emitting radionuclides other than uranium (although most of the alpha-emitting concentrations are below 3 pCi/liter); and up to 650 pCi/liter for total uranium concentrations. Elevated radium-226 concentrations are found along the Atlantic coastal region and the Midwest; low levels are usually found in the treated water supplies in the western states. Elevated uranium and alpha-emitting radionuclide concentrations are generally limited to the Rocky Mountain region and Maine and Pennsylvania in the east.

The Agency's primary drinking water regulations (40 CFR Part 141) limit the contamination levels for radium-226 and radium-228 to 5 pCi/liter and the levels for total alpha-emitting contamination (excluding radon and uranium) to 15 pCi/liter. Elevated concentrations of radium in drinking water are generally a problem associated with smaller community water systems, with an estimated 500 systems exceeding 5 pCi/liter. The Agency's risk assessments indicate that continuous consumption of water containing the maximum amount of radium allowed may cause between 0.7 and 3 cancers per year per million exposed persons.

ENVIRONMENTAL IMPACTS

A Draft Environmental Impact Statement (EIS) was prepared for the proposed rule, in accordance with the Agency's procedures for the voluntary preparation of EIS's (30 FR 37419). However, Section 121(c) of the NWPA subsequently exempted this action from preparation of an EIS under Section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA) and from any environmental review under subparagraphs (E) or (F) of Section 102(2) of the NEPA. Accordingly, a Final EIS has not been prepared for promulgation of this rule. The potential health impacts of this action are summarized above, and much of the information that would have been contained in a Final EIS is documented in the Background Information Document that accompanies this final version of 40 CFR 191.

REGULATORY IMPACTS

This rule was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291. The final rule has not been classified as a "major rule" in accordance with the guidelines provided by the Executive Order. Any comments received from OMB and EPA's responses to those comments are available for public inspection in the docket cited above under the heading "ADDRESSES."

The Agency has had to take an unusual approach in considering the regulatory impacts of this proposed action—as required by Executive Order 12291. In most cases, a regulation concerns an ongoing activity and may be considered a burden whose costs should be judged against the regulatory benefits. Here, it was not possible to quantify the costs and benefits of this action compared to the consequences of no regulation because there is no specific "baseline" program to consider. The appropriate regulations must be established before the regulated activity can even begin. Thus, the typical perspectives on costs and benefits are altered. Instead, the Agency evaluated how the costs of commercial waste management and disposal might change in response to different levels of protection from the containment requirements. Similar evaluations were not performed for the wastes from atomic energy defense activities because sufficient information was not available.

To evaluate the effects of different levels of protection, EPA considered the performance of different repository designs in several different geologic media. The costs of the various engineering controls that might be needed to meet different levels of protection were estimated.

In addition, allowances were made for the increased research and development costs that might be needed to demonstrate compliance with the standards if projected performance for a particular disposal system indicated releases less than an order of magnitude below the long-term radionuclide release limits in Section 191.13.

Since the regulatory impact analyses that supported the proposed rule were performed, the NRC has promulgated minimum requirements for the engineered barriers of a disposal system (in 10 CFR 60), more data concerning disposal sites being considered by the Department have become available, and the Agency has reviewed its performance assessments to reduce overestimates of long-term risks in accordance with the SAB review. After evaluating all of this new information, the Agency believes that there need not be any significant additional costs to the national program for disposal of commercial wastes caused by retaining the proposed level of protection in the final rule, compared to the costs of choosing levels considerably less stringent. In other words, all of the disposal sites being evaluated by the Department, assuming compliance with the existing requirements of 10 CFR 60, are expected to be able to meet these disposal standards without additional precautions beyond those already planned.

LIST OF SUBJECTS IN 40 CFR Part 191

Environmental protection, Nuclear energy, Radiation protection, Uranium, Waste treatment and disposal.

REGULATORY FLEXIBILITY CERTIFICATION

In accordance with the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Administrator hereby certifies that this rule will not have any significant impact on small businesses or other entities, and that a Regulatory Flexibility Analysis is not required. This rule will affect only a small number of facilities, most of which are or will be operated by the United States Government.

DATE: August 15, 1985

Lee M Thomas

Administrator

A new Part 191 is hereby added to Title 40, Code of Federal Regulations, as follows:

SUBCHAPTER F - RADIATION PROTECTION PROGRAMS

PART 191 - ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR MANAGEMENT AND DISPOSAL OF SPENT NUCLEAR FUEL, HIGH-LEVEL AND TRANSURANIC RADIOACTIVE WASTES

Subpart A - Environmental Standards for Management and Storage

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191.02 Definitions
191.03 Standards
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Subpart B - Environmental Standards for Disposal

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191.12 Definitions
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191.17 Alternative Provisions for Disposal
191.18 Effective Date
Appendix A Table for Subpart B
Appendix B Guidance for Implementation of Subpart B

AUTHORITY: The Atomic Energy Act of 1954, as amended; Reorganization Plan No. 3 of 1970; and the Nuclear Waste Policy Act of 1982.

SUBPART A - ENVIRONMENTAL STANDARDS FOR MANAGEMENT AND STORAGE

191.01 Applicability

This Subpart applies to:

(a) radiation doses received by members of the public as a result of the management (except for transportation) and storage of spent nuclear fuel or high-level or transuranic radioactive wastes at any facility regulated by the Nuclear Regulatory Commission or by Agreement States, to the extent that such management and storage operations are not subject to the provisions of Part 190 of Title 40; and

(b) radiation doses received by members of the public as a result of the management and storage of spent nuclear fuel or high-level or transuranic wastes at any disposal facility that is operated by the Department of Energy and that is not regulated by the Commission or by Agreement States.

191.02 Definitions

Unless otherwise indicated in this Subpart, all terms shall have the same meaning as in Subpart A of Part 190.

(a) "Agency" means the Environmental Protection Agency.

(b) "Administrator" means the Administrator of the Environmental Protection Agency.

(c) "Commission" means the Nuclear Regulatory Commission.

(d) "Department" means the Department of Energy.

(e) "NWPA" means the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425).

(f) "Agreement State" means any State with which the Commission or the Atomic Energy Commission has entered into an effective agreement under subsection 274b of the Atomic Energy Act of 1954, as amended (68 Stat. 919).

(g) "Spent nuclear fuel" means fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

(h) "High-level radioactive waste," as used in this Part, means high-level radioactive waste as defined in the Nuclear Waste Policy Act of 1982 (Pub. L. 97-425).

(i) "Transuranic radioactive waste," as used in this Part, means waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes, with half-lives greater than twenty years, per gram of waste, except for: (1) high-level radioactive waste; (2) wastes that the Department has determined, with the concurrence of the Administrator, do not need the degree of isolation required by this Part; or (3) wastes that the Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR 61.

(j) "Radioactive waste," as used in this Part, means the high-level and transuranic radioactive waste covered by this Part.

(k) "Storage" means retention of spent nuclear fuel or radioactive wastes with the intent and capability to readily retrieve such fuel or waste for subsequent use, processing, or disposal.

(l) "Disposal" means permanent isolation of spent nuclear fuel or radioactive waste from the accessible environment with no intent of recovery, whether or not such isolation permits the recovery of such fuel or waste. For example, disposal of waste in a mined geologic repository occurs when all of the shafts to the repository are backfilled and sealed.

(m) "Management" means any activity, operation, or process (except for transportation) conducted to prepare spent nuclear fuel or radioactive waste for storage or disposal, or the activities associated with placing such fuel or waste in a disposal system.

(n) "Site" means an area contained within the boundary of a location under the effective control of persons possessing or using spent nuclear fuel or radioactive waste that are involved in any activity, operation, or process covered by this Subpart.

(o) "General environment" means the total terrestrial, atmospheric, and aquatic environments outside sites within which any activity, operation, or process associated with the management and storage of spent nuclear fuel or radioactive waste is conducted.

(p) "Member of the public" means any individual except during the time when that individual is a worker engaged in any activity, operation, or process that is covered by the Atomic Energy Act of 1954, as amended.

(q) "Critical organ" means the most exposed human organ or tissue exclusive of the integumentary system (skin) and the cornea.

191.03 Standards

(a) Management and storage of spent nuclear fuel or high-level or transuranic radioactive wastes at all facilities regulated by the Commission or by Agreement States shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from: (1) discharges of radioactive material and direct radiation from such management and storage and (2) all operations covered by Part 190; shall not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other critical organ.

(b) Management and storage of spent nuclear fuel or high-level or transuranic radioactive wastes at all facilities for the disposal of such fuel or waste that are operated by the Department and that are not regulated by the Commission or Agreement States shall be conducted in such a manner as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from discharges of radioactive material and direct radiation from such management and storage shall not exceed 25 millirems to the whole body and 75 millirems to any critical organ.

191.04 Alternative Standards

(a) The Administrator may issue alternative standards from those standards established in 191.03(b) for waste management and storage activities at facilities that are not regulated by the Commission or Agreement States if, upon review of an application for such alternative standards:

(1) The Administrator determines that such alternative standards will prevent any member of the public from receiving a continuous exposure of more than 100 mrem per year dose equivalent and an infrequent exposure of more than 500 mrem dose equivalent in a year from all sources, excluding natural background and medical procedures; and

(2) The Administrator promptly makes a matter of public record the degree to which continued operation of the facility is expected to result in levels in excess of the standards specified in 191.03(b).

(b) An application for alternative standards shall be submitted as soon as possible after the Department determines that continued operation of a facility will exceed the levels specified in 191.03(b) and shall include all information necessary for the Administrator to make the determinations called for in 191.04(a).

(c) Requests for alternative standards shall be submitted to the Administrator, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C., 20460.

191.05 Effective Date

The standards in this Subpart shall be effective on [60 days after publication in the FEDERAL REGISTER].

SUBPART B - ENVIRONMENTAL STANDARDS FOR DISPOSAL

191.11 Applicability

This Subpart applies to:

(a) radioactive materials released into the accessible environment as a result of the disposal of spent nuclear fuel or high-level or transuranic radioactive wastes;

(b) radiation doses received by members of the public as a result of such disposal; and

(c) radioactive contamination of certain sources of ground water in the vicinity of disposal systems for such fuel or wastes.

However, this Subpart does not apply to disposal directly into the oceans or ocean sediments. This Subpart also does not apply to wastes disposed of before the effective date of this rule.

191.12 Definitions

Unless otherwise indicated in this Subpart, all terms shall have the same meaning as in Subpart A of this Part.

(a) "Disposal system" means any combination of engineered and natural barriers that isolate spent nuclear fuel or radioactive waste after disposal.

(b) "Waste," as used in this Subpart, means any spent nuclear fuel or radioactive waste isolated in a disposal system.

(c) "Waste form" means the materials comprising the radioactive components of waste and any encapsulating or stabilizing matrix.

(d) "Barrier" means any material or structure that prevents or substantially delays movement of water or radionuclides toward the accessible environment. For example, a barrier may be a geologic structure, a canister, a waste form with physical and chemical characteristics that significantly decrease the mobility of radionuclides, or a material placed over and around waste, provided that the material or structure substantially delays movement of water or radionuclides.

(e) "Passive institutional control" means: (1) permanent markers placed at a disposal site, (2) public records and archives, (3) government ownership and regulations regarding land or resource use, and (4) other methods of preserving knowledge about the location, design, and contents of a disposal system.

(f) "Active institutional control" means: (1) controlling access to a disposal site by any means other than passive institutional controls; (2) performing maintenance operations or remedial actions at a site, (3) controlling or cleaning up releases from a site, or (4) monitoring parameters related to disposal system performance.

(g) "Controlled area" means: (1) a surface location, to be identified by passive institutional controls, that encompasses no more than 100 square kilometers and extends horizontally no more than five kilometers in any direction from the outer boundary of the original location of the radioactive wastes in a disposal system; and (2) the subsurface underlying such a surface location.

(h) "Ground water" means water below the land surface in a zone of saturation.

(i) "Aquifer" means an underground geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring.

(j) "Lithosphere" means the solid part of the Earth below the surface, including any ground water contained within it.

(k) "Accessible environment" means: (1) the atmosphere; (2) land surfaces; (3) surface waters; (4) oceans; and (5) all of the lithosphere that is beyond the controlled area.

(l) "Transmissivity" means the hydraulic conductivity integrated over the saturated thickness of an underground formation. The transmissivity of a series of formations is the sum of the individual transmissivities of each formation comprising the series.

(m) "Community water system" means a system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

(n) "Significant source of ground water," as used in this Part, means: (1) an aquifer that: (i) is saturated with water having less than 10,000 milligrams per liter of total dissolved solids; (ii) is within 2,500 feet of the land surface; (iii) has a transmissivity greater than 200 gallons per day per foot, provided that any formation or part of a formation included within the source of ground water has a hydraulic conductivity greater than 2 gallons per day per square foot; and (iv) is capable of continuously yielding at least 10,000 gallons per day to a pumped or flowing well for a period of at least a year; or (2) an aquifer that provides the primary source of water for a community water system as of the effective date of this Subpart.

(o) "Special source of ground water," as used in this Part, means those Class I ground waters identified in accordance with the Agency's Ground-Water Protection Strategy published in August 1984 that: (1) are within the controlled area encompassing a disposal system or are less than five kilometers beyond the controlled area; (2) are supplying drinking water for thousands of persons as of the date that the Department chooses a location within that area for detailed characterization as a potential site for a disposal system (e.g., in accordance with Section 112(b)(1)(B) of the NWPA); and (3) are irreplaceable in that no reasonable alternative source of drinking water is available to that population.

(p) "Undisturbed performance" means the predicted behavior of a disposal system, including consideration of the uncertainties in predicted behavior, if the disposal system is not disrupted by human intrusion or the occurence of unlikely natural events.

(q) "Performance assessment" means an analysis that: (1) identifies the processes and events that might affect the disposal system; (2) examines the effects of these processes and events on the performance of the disposal system; and (3) estimates the cumulative releases of radionuclides, considering the associated uncertainties, caused by all significant processes and events. These estimates shall be incorporated into an overall probability distribution of cumulative release to the extent practicable.

(r) "Heavy metal" means all uranium, plutonium, or thorium placed into a nuclear reactor.

(s) "Implementing agency," as used in this Subpart, means the Commission for spent nuclear fuel or high-level or transuranic wastes to be disposed of in facilities licensed by the Commission in accordance with the Energy Reorganization Act of 1974 and the Nuclear Waste Policy Act of 1982, and it means the Department for all other radioactive wastes covered by this Part.

191.13 Containment Requirements

(a) Disposal systems for spent nuclear fuel or high-level or transuranic radioactive wastes shall be designed to provide a reasonable expectation, based upon performance assessments, that the cumulative releases of radionuclides to the accessible environment for 10,000 years after disposal from all significant processes and events that may affect the disposal system shall:

(1) have a likelihood of less than one chance in 10 of exceeding the quantities calculated according to Table 1 (Appendix A); and

(2) have a likelihood of less than one chance in 1,000 of exceeding ten times the quantities calculated according to Table 1 (Appendix A).

(b) Performance assessments need not provide complete assurance that the requirements of 191.13(a) will be met. Because of the long time period involved and the nature of the events and processes of interest, there will inevitably be substantial uncertainties in projecting disposal system performance. Proof of the future performance of a disposal system is not to be had in the ordinary sense of the word in situations that deal with much shorter time frames. Instead, what is required is a reasonable expectation, on the basis of the record before the implementing agency, that compliance with 191.13(a) will be achieved.

191.14 Assurance Requirements

To provide the confidence needed for long-term compliance with the requirements of 191.13, disposal of spent nuclear fuel or high-level or transuranic wastes shall be conducted in accordance with the following provisions, except that these provisions do not apply to facilities regulated by the Commission (see 10 CFR Part 60 for comparable provisions applicable to facilities regulated by the Commission):

(a) Active institutional controls over disposal sites should be maintained for as long a period of time as is practicable after disposal; however, performance assessments that assess isolation of the wastes from the accessible environment shall not consider any contributions from active institutional controls for more than 100 years after disposal.

(b) Disposal systems shall be monitored after disposal to detect substantial and detrimental deviations from expected performance. This monitoring shall be done with techniques that do not jeopardize the isolation of the wastes and shall be conducted until there are no significant concerns to be addressed by further monitoring.

(c) Disposal sites shall be designated by the most permanent markers, records, and other passive institutional controls practicable to indicate the dangers of the wastes and their location.

(d) Disposal systems shall use different types of barriers to isolate the wastes from the accessible environment. Both engineered and natural barriers shall be included.

(e) Places where there has been mining for resources, or where there is a reasonable expectation of exploration for scarce or easily accessible resources, or where there is a significant concentration of any material that is not widely available from other sources, should be avoided in selecting disposal sites. Resources to be considered shall include minerals, petroleum or natural gas, valuable geologic formations, and ground waters that are either irreplaceable because there is no reasonable alternative source of drinking water available for substantial populations or that are vital to the preservation of unique and sensitive ecosystems. Such places shall not be used for disposal of the wastes covered by this Part unless the favorable characteristics of such places compensate for their greater likelihood of being disturbed in the future.

(f) Disposal systems shall be selected so that removal of most of the wastes is not precluded for a reasonable period of time after disposal.

191.15 Individual Protection Requirements

Disposal systems for spent nuclear fuel or high-level or transuranic radioactive wastes shall be designed to provide a reasonable expectation that, for 1,000 years after disposal, undisturbed performance of the disposal system shall not cause the annual dose equivalent from the disposal system to any member of the public in the accessible environment to exceed 25 millirems to the whole body or 75 millirems to any critical organ.

All potential pathways (associated with undisturbed performance) from the disposal system to people shall be considered, including the assumption that individuals consume 2 liters per day of drinking water from any significant source of ground water outside of the controlled area.

191.16 Ground Water Protection Requirements

(a) Disposal systems for spent nuclear fuel or high-level or transuranic radioactive wastes shall be designed to provide a reasonable expectation that, for 1,000 years after disposal, undisturbed performance of the disposal system shall not cause the radionuclide concentrations averaged over any year in water withdrawn from any portion of a special source of ground water to exceed:

(1) 5 picocuries per liter of radium-226 and radium-228;

(2) 15 picocuries per liter of alpha-emitting radionuclides (including radium-226 and radium-228 but excluding radon); or

(3) the combined concentrations of radionuclides that emit either beta or gamma radiation that would produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem per year if an individual consumed 2 liters per day of drinking water from such a source of ground water.

(b) If any of the average annual radionuclide concentrations existing in a special source of ground water before construction of the disposal system already exceed the limits in 191.16(a), the disposal system shall be designed to provide a reasonable expectation that, for 1,000 years after disposal, undisturbed performance of the disposal system shall not increase the existing average annual radionuclide concentrations in water withdrawn from that special source of ground water by more than the limits established in 191.16(a).

191.17 Alternative Provisions for Disposal

The Administrator may, by rule, substitute for any of the provisions of Subpart B alternative provisions chosen after:

(a) the alternative provisions have been proposed for public comment in the FEDERAL REGISTER together with information describing the costs, risks, and benefits of disposal in accordance with the alternative provisions and the reasons why compliance with the existing provisions of Subpart B appears inappropriate;

(b) a public comment period of at least 90 days has been completed, during which an opportunity for public hearings in affected areas of the country has been provided; and

(c) the public comments received have been fully considered in developing the final version of such alternative provisions.

191.18 Effective Date

The standards in this Subpart shall be effective on [60 days after publication in the FEDERAL REGISTER].

APPENDIX A - TABLE FOR SUBPART B

TABLE 1 - RELEASE LIMITS FOR CONTAINMENT REQUIREMENTS
(Cumulative Releases to the Accessible Environment
for 10,000 Years After Disposal)

Radionuclide	Release Limit per 1000 MTHM or other unit of waste (see Notes) (curies)
Americium-241 or -243	100
Carbon-14	100
Cesium-135 or -137	1000
Iodine-129	100
Neptunium-237	100
Plutonium-238, -239, -240, or -242	100
Radium-226	100
Strontium-90	1000
Technetium-99	10000
Thorium-230 or -232	10
Tin-126	1000
Uranium-233, -234, -235, -236, or -238	100
Any other alpha-emitting radionuclide with a half-life greater than 20 years	100
Any other radionuclide with a half-life greater than 20 years that does not emit alpha particles	1000

Application of Table 1

NOTE 1: Units of Waste. The Release Limits in Table 1 apply to the amount of wastes in any one of the following:

(a) an amount of spent nuclear fuel containing 1,000 metric tons of heavy metal (MTHM) exposed to a burnup between 25,000 megawatt-days per metric ton of heavy metal (MWd/MTHM) and 40,000 MWd/MTHM;

(b) the high-level radioactive wastes generated from reprocessing each 1,000 MTHM exposed to a burnup between 25,000 MWd/MTHM and 40,000 MWd/MTHM;

(c) each 100,000,000 curies of gamma or beta-emitting radionuclides with half-lives greater than 20 years but less than 100 years (for use as discussed in Note 5 or with materials that are identified by the Commission as high-level radioactive waste in accordance with part B of the definition of high-level waste in the NWPA);

(d) each 1,000,000 curies of other radionuclides (i.e., gamma or beta-emitters with half-lives greater than 100 years or any alpha-emitters with half-lives greater than 20 years) (for use as discussed in Note 5 or with materials that are identified by the Commission as high-level radioactive waste in accordance with part B of the definition of high-level waste in the NWPA); or

(e) an amount of transuranic (TRU) wastes containing one million curies of alpha-emitting transuranic radionuclides with half-lives greater than 20 years.

NOTE 2: Release Limits for Specific Disposal Systems. To develop Release Limits for a particular disposal system, the quantities in Table 1 shall be adjusted for the amount of waste included in the disposal system compared to the various units of waste defined in Note 1. For example:

(a) If a particular disposal system contained the high-level wastes from 50,000 MTHM, the Release Limits for that system would be the quantities in Table 1 multiplied by 50 (50,000 MTHM divided by 1,000 MTHM).

(b) If a particular disposal system contained three million curies of alpha-emitting transuranic wastes, the Release Limits for that system would be the quantities in Table 1 multiplied by three (three million curies divided by one million curies).

(c) If a particular disposal system contained both the high-level wastes from 50,000 MTHM and 5 million curies of alpha-emitting transuranic wastes, the Release Limits for that system would be the quantities in Table 1 multiplied by 55:

$$\frac{50{,}000 \text{ MTHM}}{1{,}000 \text{ MTHM}} + \frac{5{,}000{,}000 \text{ curies TRU}}{1{,}000{,}000 \text{ curies TRU}} = 55$$

NOTE 3: Adjustments for Reactor Fuels with Different Burnup. For disposal systems containing reactor fuels (or the high-level wastes from reactor fuels) exposed to an average burnup of less than 25,000 MWd/MTHM or greater than 40,000 MWd/MTHM, the units of waste defined in (a) and (b) of Note 1 shall be adjusted. The unit shall be multiplied by the ratio of 30,000 MWd/MTHM divided by the fuel's actual average burnup, except that a value of 5,000 MWd/MTHM may be used when the average fuel burnup is below 5,000 MWd/MTHM and a value of 100,000 MWd/MTHM shall be used when the average fuel burnup is above 100,000 MWd/MTHM. This adjusted unit of waste shall then be used in determining the Release Limits for the disposal system.

For example, if a particular disposal system contained only high-level wastes with an average burnup of 3,000 MWd/MTHM, the unit of waste for that disposal system would be:

$$1{,}000 \text{ MTHM} \times \frac{(30{,}000 \text{ MWd/MTHM})}{(\ 5{,}000 \text{ MWd/MTHM})} = 6{,}000 \text{ MTHM}$$

If that disposal system contained the high-level wastes from 60,000 MTHM (with an average burnup of 3,000 MWd/MTHM), then the Release Limits for that system would be the quantities in Table 1 multiplied by ten:

$$\frac{60{,}000 \text{ MTHM}}{6{,}000 \text{ MTHM}} = 10$$

which is the same as:

$$\frac{60{,}000 \text{ MTHM}}{1{,}000 \text{ MTHM}} \times \frac{(\ 5{,}000 \text{ MWd/MTHM})}{(30{,}000 \text{ MWd/MTHM})} = 10$$

NOTE 4: Treatment of Fractionated High-Level Wastes. In some cases, a high-level waste stream from reprocessing spent nuclear fuel may have been (or will be) separated into two or more high-level waste components destined for different disposal systems. In such cases, the implementing agency may allocate the Release Limit multiplier (based upon the original MTHM and the average fuel burnup of the high-level waste stream) among the various disposal systems as it chooses, provided that the total Release Limit multiplier used for that waste stream at all of its disposal systems may not exceed the Release Limit multiplier that would be used if the entire waste stream were disposed of in one disposal system.

NOTE 5: Treatment of Wastes with Poorly Known Burnups or Original MTHM. In some cases, the records associated with particular high-level waste streams may not be adequate to accurately determine the original metric tons of heavy metal in the reactor fuel that created the waste, or to determine the average burnup that the fuel was exposed to. If the uncertainties are such that the original amount of heavy metal or the average fuel burnup for particular high-level waste streams cannot be quantified, the units of waste derived from (a) and (b) of Note 1 shall no longer be used. Instead, the units of waste defined in (c) and (d) of Note 1 shall be used for such high-level waste streams. If the uncertainties in such information allow a range of values to be associated with the original amount of heavy metal or the average fuel burnup, then the calculations described in previous Notes will be conducted using the values that result in the smallest Release Limits, except that the Release Limits need not be smaller than those that would be calculated using the units of waste defined in (c) and (d) of Note 1.

NOTE 6: Use of Release Limits to Determine Compliance with 191.13. Once release limits for a particular disposal system have been determined in accordance with Notes 1 through 5, these release limits shall be used to determine compliance with the requirements of 191.13 as follows. In cases where a mixture of radionuclides is projected to be released to the accessible environment, the limiting values shall be determined as follows: For each radionuclide in the mixture, determine the ratio between the cumulative release quantity projected over 10,000 years and the limit for that radionuclide as determined from Table 1 and Notes 1 through 5. The sum of such ratios for all the radionuclides in the mixture may not exceed one with regard to 191.13(a)(1) and may not exceed ten with regard to 191.13(a)(2).

For example, if radionuclides A, B, and C are projected to be released in amounts Q_a, Q_b, and Q_c, and if the applicable Release Limits are RL_a, RL_b, and RL_c, then the cumulative releases over 10,000 years shall be limited so that the following relationship exists:

$$\frac{Q_a}{RL_a} + \frac{Q_b}{RL_b} + \frac{Q_c}{RL_c} \leq 1$$

APPENDIX B - GUIDANCE FOR IMPLEMENTATION OF SUBPART B

[NOTE: The supplemental information in this appendix is not an integral part of 40 CFR 191. Therefore, the implementing agencies are not bound to follow this guidance. However, it is included because it describes the Agency's assumptions regarding the implementation of Subpart B. This appendix will appear in the Code of Federal Regulations.]

The Agency believes that the implementing agencies must determine compliance with 191.13, 191.15, and 191.16 of Subpart B by evaluating long-term predictions of disposal system performance. Determining compliance with 191.13 will also involve predicting the likelihood of events and processes that may disturb the disposal system. In making these various predictions, it will be appropriate for the implementing agencies to make use of rather complex computational models, analytical theories, and prevalent expert judgment relevant to the numerical predictions. Substantial uncertainties are likely to be encountered in making these predictions. In fact, sole reliance on these numerical predictions to determine compliance may not be appropriate; the implementing agecies may choose to supplement such predictions with qualitative judgements as well. Because the procedures for determining compliance with Subpart B have not been formulated and tested yet, this appendix to the rule indicates the Agency's assumptions regarding certain issues that may arise when implementing sections 191.13, 191.15, and 191.16. Most of this guidance applies to any type of disposal system for the wastes covered by this rule. However, several sections apply only to disposal in mined geologic repositories and would be inappropriate for other types of disposal systems.

Consideration of Total Disposal System. When predicting disposal system performance, the Agency assumes that reasonable projections of the protection expected from all of the engineered and natural barriers of a disposal system will be considered. Portions of the disposal system should not be disregarded, even if projected performance is uncertain, except for portions of the system that make negligible contributions to the overall isolation provided by the disposal system.

Scope of Performance Assessments. Section 191.13 requires the implementing agencies to evaluate compliance through performance assessments as defined in Section 191.12(q). The Agency assumes that such performance assessments need not consider categories of events or processes that are estimated to have less than one chance in 10,000 of occurring over 10,000 years. Furthermore, the performance assessments need not evaluate in detail the releases from all events and processes estimated to have a greater likelihood of occurrence. Some of these events and processes may be omitted from the performance assessments if there is a reasonable expectation that the remaining probability distribution of cumulative releases would not be significantly changed by such omissions.

Compliance with Section 191.13. The Agency assumes that, whenever practicable, the implementing agency will assemble all of the results of the performance assessments to determine compliance with 191.13 into a "complementary cumulative distribution function" that indicates the probability of exceeding various levels of cumulative release. When the uncertainties in parameters are considered in a performance assessment, the effects of the uncertainties considered can be incorporated into a single such distribution function for each disposal system considered. The Agency assumes that a disposal system can be considered to be in compliance with 191.13 if this single distribution function meets the requirements of 191.13(a).

Compliance with Sections 191.15 and 191.16. When the uncertainties in undisturbed performance of a disposal system are considered, the implementing agencies need not require that a very large percentage of the range of estimated radiation exposures or radionuclide concentrations fall below limits established in 191.15 and 191.16, respectively. The Agency assumes that compliance can be determined based upon "best estimate" predictions (e.g., the mean or the median of the appropriate distribution, whichever is higher).

Institutional Controls. To comply with 191.14(a), the implementing agency will assume that none of the active institutional controls prevent or reduce radionuclide releases for more than 100 years after disposal. However, the Federal Government is committed to retaining ownership of all disposal sites for spent nuclear fuel and high-level and transuranic radioactive wastes and will establish appropriate markers and records, consistent with 191.14(c). The Agency assumes that, as long as such passive institutional controls endure and are understood, they: (1) can be effective in deterring systematic or persistent exploitation of these disposal sites; and (2) can reduce the likelihood of inadvertent, intermittent human intrusion to a degree to be determined by the implementing agency. However, the Agency believes that passive institutional controls can never be assumed to eliminate the chance of inadvertent and intermittent human intrusion into these disposal sites.

Consideration of Inadvertent Human Intrusion into Geologic Repositories. The most speculative potential disruptions of a mined geologic repository are those associated with inadvertent human intrusion. Some types of intrusion would have virtually no effect on a repository's containment of waste. On the other hand, it is possible to conceive of intrusions (involving widespread societal loss of knowledge regarding radioactive wastes) that could result in major disruptions that no reasonable repository selection or design precautions could alleviate. The Agency believes that the most productive consideration of inadvertent intrusion concerns those realistic possibilities that may be usefully mitigated by repository design, site selection, or use of passive controls (although passive institutional controls should not be assumed to completely rule out the possibility of intrusion). Therefore, inadvertent and intermittent intrusion by exploratory drilling for resources (other than any provided by the disposal system itself) can be the most severe intrusion scenario assumed by the implementing agencies. Furthermore, the implementing agencies can assume that passive institutional controls or the intruders' own exploratory procedures are adequate for the intruders to soon detect, or be warned of, the incompatibility of the area with their activities.

Frequency and Severity of Inadvertent Human Intrusion into Geologic Repositories. The implementing agencies should consider the effects of each particular disposal system's site, design, and passive institutional controls in judging the likelihood and consequences of such inadvertent exploratory drilling. However, the Agency assumes that the likelihood of such inadvertent and intermittent drilling need not be taken to be greater than 30 boreholes per square kilometer of repository area per 10,000 years for geologic repositories in proximity to sedimentary rock formations, or more than 3 boreholes per square kilometer per 10,000 years for repositories in other geologic formations. Furthermore, the Agency assumes that the consequences of such inadvertent drilling need not be assumed to be more severe than: (1) direct release to the land surface of all the ground water in the repository horizon that would promptly flow through the newly created borehole to the surface due to natural lithostatic pressure—or (if pumping would be required to raise water to the surface) release of 200 cubic meters of ground water pumped to the surface if that much water is readily available to be pumped; and (2) creation of a ground water flow path with a permeability typical of a borehole filled by the soil or gravel that would normally settle into an open hole over time—not the permeability of a carefully sealed borehole.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICE OF THE
CHAIRMAN

October 29, 1985

The Honorable Pete V. Domenici, Chairman
Subcommittee on Energy Research and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

We are pleased to respond to your letter of October 16, 1985, with additional questions for the record of the October 8 hearing on low-level waste. We are also enclosing inserts for the record of the hearing.

Sincerely,

James K. Asselstine
Acting Chairman

Enclosures:
1. October 16, 1985 responses
2. Transcript Insert, page 75
3. Transcript Insert, page 78

cc: Senator Wendell H. Ford
Senator James A. McClure
Senator J. Bennett Johnston
Senator Alan K. Simpson
Senator Gary Hart

QUESTIONS FROM SENATOR PETE V. DOMENICI

QUESTION 1. S. 1578 REQUIRES THE DOE TO SUBMIT A REPORT IDENTIFYING RADIOACTIVE WASTES FOR WHICH NO RESPONSIBILITY NOW EXISTS FOR DISPOSAL -- I.E., SO-CALLED "ORPHAN WASTES." DOES THE NRC HAVE ANY CURRENT PLAN TO REDEFINE CERTAIN CATEGORIES OF WASTES? WOULD SUCH REDEFINITION HELP DOE PREPARE ITS REPORT?

ANSWER.

THE COMMISSION IS CURRENTLY CONSIDERING RULEMAKING ACTIONS TO OBTAIN PUBLIC INPUT REGARDING POTENTIAL CLASSIFICATION OF ADDITIONAL WASTES AS HIGH-LEVEL WASTES. THIS EFFORT AND ANY SUBSEQUENT RULEMAKING WOULD BE BASED ON AUTHORITY PROVIDED TO THE NRC UNDER THE NUCLEAR WASTE POLICY ACT OF 1982. WASTES FOR WHICH DISPOSAL RESPONSIBILITY IS NOT CLEARLY SPECIFIED, SO-CALLED "ORPHAN WASTES," HAVE BEEN CONSIDERED BY NRC STAFF IN DEVELOPING A PROPOSED RULEMAKING. IT IS NOT CERTAIN AT THIS TIME WHICH OF THESE WASTES, IF ANY, MIGHT BE REDEFINED AS HIGH-LEVEL WASTE.

WE DO NOT ANTICIPATE COMPLETING A HIGH-LEVEL WASTE DEFINITION RULEMAKING WITHIN THE TIMEFRAME FOR THE DOE STUDY IDENTIFIED IN S. 1578. FURTHER, WE DO NOT BELIEVE SUCH A STUDY IS NEEDED

QUESTION 1. (CONTINUED) 2

IN ORDER TO DETERMINE THE RESPONSIBILITY FOR ULTIMATE DISPOSAL OF THESE ORPHAN WASTES. THE COMMISSION SUPPORTS ASSIGNMENT OF DISPOSAL RESPONSIBILITY FOR ORPHAN WASTES TO DOE.

THE COMMISSION DOES SUPPORT A DOE STUDY PROVIDING RECOMMENDATIONS ON MANAGEMENT OF "ORPHAN WASTE" BY DOE. IF THE QUESTION OF DISPOSAL RESPONSIBILITY IS SETTLED NOW, THIS SHOULD ASSIST DOE'S CONSIDERATION OF MANAGEMENT OPTIONS. WE BELIEVE THE TECHNICAL INFORMATION NRC MAY DEVELOP IN ITS RULEMAKING PROCESS MAY PROVIDE USEFUL INFORMATION FOR DOE TO CONSIDER IN EVALUATING APPROPRIATE METHODS FOR DISPOSAL OF THOSE ADDITIONAL WASTES FOR WHICH DOE WOULD BE ASSIGNED RESPONSIBILITY. NRC STAFF WILL CONTINUE TO SHARE TECHNICAL INFORMATION WITH DOE TO ACCOMPLISH THIS PURPOSE.

QUESTIONS FROM SENATOR PETE V. DOMENICI

QUESTION 2. WHEN IS THE REPORT DUE OUT WITH THE RESULTS OF BROOKHAVEN'S EVALUATION OF CHEMICALLY-HAZARDOUS RADIOACTIVE WASTES? WILL THIS REPORT BE TIMELY IN ADDRESSING THE CONCERNS OF THE FACILITY OPERATORS WITH RESPECT TO RCRA REGULATIONS OF HAZARDOUS WASTES?

ANSWER.

BROOKHAVEN NATIONAL LABORATORY IS UNDERTAKING SEVERAL STUDIES ON BEHALF OF THE NRC REGARDING CHEMICALLY HAZARDOUS COMMERCIAL LOW-LEVEL RADIOACTIVE WASTES (MIXED-WASTES). THE TWO MAJOR ONES ARE A STUDY IDENTIFYING COMMERCIAL LOW-LEVEL WASTES WHICH MAY BE CLASSIFIED AS HAZARDOUS UNDER U.S ENVIRONMENTAL PROTECTION AGENCY (EPA) REGULATIONS, AND A TECHNICAL STUDY ON EVALUATING OPTIONS FOR SAFELY MANAGING MIXED-WASTES. WE ANTICIPATE THE "IDENTIFICATION STUDY" WILL BE AVAILABLE FOR GENERAL DISTRIBUTION IN ABOUT A MONTH. THE FINAL REPORT ON "MANAGEMENT OPTIONS" SHOULD BE PUBLISHED IN EARLY 1986. NRC HAS ALSO ASKED BROOKHAVEN TO FURTHER EVALUATE SEVERAL CANDIDATE MIXED-WASTES IN ORDER TO BETTER CHARACTERIZE THEIR CHEMICAL COMPOSITION AND EXPECTED PERFORMANCE IN THE DISPOSAL ENVIRONMENT.

THESE REPORTS WOULD BE TIMELY FOR EPA AND NRC USE IN DEVELOPING THE REGULATORY FRAMEWORK REQUIRED UNDER H.R. 1083 AS REPORTED BY THE HOUSE INTERIOR COMMITTEE.

QUESTIONS FROM SENATOR PETE V. DOMENICI

QUESTION 3. WHAT CAN BE DONE TO ASSURE THAT NRC REVIEWS LICENSE APPLICATIONS IN AN EXPEDITIOUS MANNER?

ANSWER.

EXPEDITIOUS NRC REVIEW OF LOW-LEVEL WASTE DISPOSAL FACILITY LICENSE APPLICATIONS CAN BEST BE ASSURED BY EARLY CONSIDERATION OF TECHNICAL ISSUES AFFECTING LICENSING, AND SUBMITTAL OF AN ACCEPTABLE, COMPLETE, AND HIGH-QUALITY LICENSE APPLICATION FOR REVIEW. EARLY IDENTIFICATION OF TECHNICAL OR REGULATORY ISSUES BY SITE DEVELOPERS WILL ALLOW NRC TO IDENTIFY THE TECHNICAL ANALYSES REQUIRED TO SUPPORT A LICENSE APPLICATION, AND TO DEVELOP POSITIONS ON PERTINENT QUESTIONS IN A TIMELY MANNER.

A HIGH QUALITY LICENSE APPLICATION WOULD HELP ENSURE THAT LICENSING PROCEEDINGS ARE NOT DELAYED BY A LACK OF INFORMATION OR INCOMPLETE TECHNICAL ANALYSIS. THE APPLICANT CARRIES THE BURDEN OF DEMONSTRATING THAT THE PROPOSED FACILITY WOULD MEET THE PERFORMANCE OBJECTIVES AND TECHNICAL REQUIREMENTS IDENTIFIED IN 10 CFR PART 61.

THE NRC RECOGNIZES THE IMPORTANCE OF PROVIDING TECHNICAL GUIDANCE DOCUMENTS AND PRE-LICENSING ASSISTANCE TO SITE DEVELOPERS, AND AS SUCH IS UNDERTAKING THIS TASK. THE UTILITY OF THIS GUIDANCE WILL BE CONSIDERABLY ENHANCED BY EARLY IDENTIFICATION OF SITE-SPECIFIC LICENSING CONCERNS BY FACILITY DEVELOPERS.

QUESTIONS FROM SENATOR PETE V. DOMENICI

QUESTION 4. HOW WOULD RESOLUTION OF THE MIXED WASTE ISSUE BETWEEN NRC AND EPA APPLY TO "AGREEMENT STATES"?

ANSWER.

THE HOUSE INTERIOR COMMITTEE-ADOPTED VERSION OF H.R. 1083 -- THE ONLY BILL THAT NOW ADDRESSES THIS QUESTION -- IS SILENT ON THE INTENT OF CONGRESS REGARDING DELEGATION OF RCRA AUTHORITY FOR MIXED-WASTE REGULATION FROM NRC TO AGREEMENT STATES. IT WOULD BE APPROPRIATE TO CLARIFY THAT AGREEMENT STATE AGENCIES WOULD ALSO BE AUTHORIZED TO ISSUE RCRA PERMITS FOR MIXED WASTE DISPOSAL AT AGREEMENT STATE-LICENSED DISPOSAL FACILITIES PURSUANT TO THE EPA-NRC AGREEMENT UNDER SECTION 15 OF THE HOUSE INTERIOR COMMITTEE BILL. IT SHOULD ALSO BE UNDERSTOOD THAT THIS AUTHORITY WOULD BE CARRIED OUT UNDER NRC OVERSIGHT PURSUANT TO ITS AGREEMENT WITH EPA.

AUTHORITY FOR EPA DELEGATION OF RCRA AUTHORITY TO AGREEMENT STATES THROUGH NRC MAY REQUIRE AN AMENDMENT TO SECTION 15. WE WOULD RECOMMEND AMENDING THE END OF SECTION 15(C) OF H.R. 1083 AS FOLLOWS:

"FURTHERMORE, THE NUCLEAR REGULATORY COMMISSION MAY REDELEGATE, AS APPROPRIATE, THE AUTHORITY TO ISSUE PERMITS TO THE AGREEMENT STATES."

QUESTIONS FROM SENATOR PETE V. DOMENICI

QUESTION 5: WHAT APPROACH DO YOU PLAN ON TAKING IN ESTABLISHING DE MINIMUS STANDARDS --

(A) CASE-BY-CASE? (I.E., ELEMENT-SPECIFIC)

(B) GENERIC? (I.E., RADIATION LEVEL-SPECIFIC)

ANSWER.

DE MINIMIS STANDARDS ARE NOT EASILY STATED, EITHER IN TERMS OF DOSES OR HOW THE STANDARDS ARE TO BE APPLIED. THERE ARE, HOWEVER, WAYS TO CONSIDER EXEMPTING CERTAIN RADIOACTIVE WASTES FROM REGULATORY CONTROL. THE WAY TO EXEMPT A WASTE, APPLYING GOOD RADIATION PROTECTION PRACTICES, IS TO ASSURE THAT:

1. THE DOSE TO THE HIGHEST EXPOSED INDIVIDUAL, USING CONSERVATIVE ASSUMPTIONS, IS WITHIN ESTABLISHED LIMITS FOR PUBLIC EXPOSURE.

2. THE AVERAGE DOSE TO INDIVIDUALS IN GROUPS EXPECTED TO RECEIVE THE GREATEST EXPOSURE IS A SMALL FRACTION OF LIMITS FOR PUBLIC EXPOSURE.

QUESTION 5. (CONTINUED) 2

3. THE ASSESSMENT INDICATES A FAVORABLE COST-BENEFIT BALANCE WHEN COMPARED TO DISPOSAL ALTERNATIVES. CONSIDERATION OF ADDITIONAL FACTORS SUCH AS RADIATION DOSE AND COSTS ASSOCIATED WITH REGULATION AND OPERATION OF ALTERNATIVE METHODS OF DISPOSAL ARE TAKEN INTO ACCOUNT IN PERFORMING THIS ANALYSIS.

THIS WAS THE PROCEDURE THAT WAS SUCCESSFULLY FOLLOWED IN DEVELOPING 10 CFR 20.306 FOR DISPOSAL OF CERTAIN TRITIUM AND CARBON-14 BIOMEDICAL WASTES. IN ORDER TO ANALYZE EXPOSURE PATHWAYS AND COLLECTIVE DOSE, THE ANALYSIS MUST BE SPECIFIC TO A TYPE OF WASTE RATHER THAN GENERALIZED.

QUESTIONS FROM SENATOR PETE V. DOMINICI

QUESTION 6. DOES NRC HAVE ENOUGH RESOURCES (MANPOWER AND FUNDING) TO DEVELOP LICENSING GUIDELINES FOR ALTERNATIVE DISPOSAL TECHNOLOGIES AND TO EXPEDITIOUSLY PROCESS ALL SITE LICENSE APPLICATIONS?

ANSWER.

THE NRC HAS BUDGETED SUFFICIENT STAFF AND FUNDING RESOURCES TO DEVELOP LICENSING GUIDELINES FOR ALTERNATIVE DISPOSAL TECHNOLOGIES, PROVIDED THAT SUCH GUIDELINES MAY BE ISSUED THROUGH LESS FORMAL MEANS THAN RULEMAKING. EFFORTS ARE CURRENTLY UNDERWAY TO PROVIDE GENERIC GUIDANCE ON A RANGE OF ALTERNATIVE DISPOSAL METHODS. WE PLAN TO SUPPLEMENT THIS GENERIC GUIDANCE WITH PRE-LICENSING ASSISTANCE TARGETED TO SPECIFIC DISPOSAL SITE DEVELOPERS. A RULEMAKING REQUIREMENT, AS NOW SPECIFIED IN S. 1578, HAS NOT BEEN BUDGETED AND WOULD REQUIRE ADDITIONAL RESOURCES.

WE WOULD FURTHER NOTE THAT THE ONE YEAR RULEMAKING SCHEDULE CONTAINED IN S.1578 IS HALF THE TIME NRC HAS SET AS ITS GOAL FOR RULEMAKING. RULEMAKING COULD DELAY IMPLEMENTATION OF THE LOW-LEVEL RADIOACTIVE WASTE POLICY ACT (LLRWPA), IF STATES AND COMPACTS DECIDE THAT THEY CANNOT PROCEED WITH SITING UNTIL

QUESTION 6. (CONTINUED) 2

THE NRC RULE IS COMPLETED. THE COMBINED GENERIC GUIDELINES, PRE-LICENSING ASSISTANCE APPROACH DESCRIBED ABOVE IS BASED ON SIMULTANEOUS PROGRESS BY BOTH NRC AND THE ENTITIES RESPONSIBLE FOR NEW SITE DEVELOPMENT.

WE EXPECT THAT THE MAJORITY OF LICENSE APPLICATIONS FOR NEW LOW-LEVEL WASTE DISPOSAL FACILITIES WILL BE SUBMITTED TO AGREEMENT STATES FOR ACTION. CONSEQUENTLY, WE HAVE PLANNED FOR ONLY A LIMITED NUMBER OF DIRECT APPLICATION SUBMITTALS TO NRC, AND ARE INCREASING OUR COMMITMENT FOR ASSISTING AGREEMENT STATES IN CARRYING OUT THEIR REGULATORY RESPONSIBILITIES. THE CRITICAL TIME PERIOD FOR LICENSE REVIEW IS EXPECTED TO BEGIN IN 1990. WE PLAN TO MONITOR SITING PROGRESS CLOSELY DURING THE COMING YEARS IN ORDER TO IDENTIFY THE RESOURCES NEEDED FOR NRC TO MEET ITS RESPONSIBILITIES.

WE WOULD LIKE TO EMPHASIZE THE IMPORTANCE WE PLACE ON TIMELY NRC REGULATORY GUIDANCE AND PRE-LICENSING ASSISTANCE TO STATES AND COMPACTS, AND HAVE PLANNED AND BUDGETED ADEQUATE RESOURCES FOR A PROGRAM TO ACCOMPLISH THIS. HOWEVER, THE PROPOSED LEGISLATION CONTAINS PROVISIONS FOR ACTIVITIES THAT NRC HAD NOT ANTICIPATED AND HAVE NOT BUDGETED FOR. SHOULD THE BILL BE PASSED, ADDITIONAL NRC RESOURCES WOULD BE REQUIRED.

WE BELIEVE SOME OF THE NRC ACTIONS REQUIRED IN S. 1578 WOULD NOT EFFECTIVELY CONTRIBUTE TO IMPLEMENTATION OF THE LLRWPA. OUR COMMENTS ON THE AMENDED H.R. 1083, AS ADOPTED BY THE HOUSE INTERIOR COMMITTEE, SUGGESTED APPROACHES TO RESOLVING OUR SPECIFIC CONCERNS.

QUESTIONS FROM SENATOR PETE V. DOMENICI

QUESTION 7. HOW LONG WOULD IT NORMALLY TAKE A STATE TO PUT AN INTERIM STORAGE FACILITY INTO OPERATION--THAT IS, IF A STATE WAS REASONABLY SURE THAT IT WOULD NOT HAVE A PERMANENT DISPOSAL FACILITY IN OPERATION BY 1993, HOW MUCH LEAD TIME WOULD THEY NEED TO OBTAIN THE LICENSE AND HARDWARE FOR TEMPORARY STORAGE?

ANSWER.

DEPENDING UPON THE COMPLEXITY OF THE PROPOSED OPERATION; (E.G., WASTE SEGREGATION AND REPACKAGING, INCINERATION FOR VOLUME REDUCTION, ETC.), WE ESTIMATE THAT NRC LICENSING OF AN INTERIM WASTE STORAGE FACILITY WOULD TAKE FROM NINE TO EIGHTEEN MONTHS. IF LITIGATION WERE INVOLVED, THE LICENSING TIME WOULD BE LONGER. STILL MORE TIME WOULD BE REQUIRED IF IT WERE DETERMINED THAT AN ENVIRONMENTAL IMPACT STATEMENT OR AMENDMENT OF THE REACTOR OPERATING LICENSE WERE REQUIRED.

THE STATE OR APPLICANT WOULD NEED LEAD TIME TO DESIGN THE STORAGE FACILITY, TO PREPARE THE LICENSE APPLICATION, AND LATER TO CONSTRUCT THE FACILITY. WE ESTIMATE THESE WOULD TAKE ABOUT 18 MONTHS. THEREFORE, THE MINIMUM TIME TO PUT A FACILITY INTO OPERATION FROM THE DATE A DECISION WAS MADE WOULD BE ABOUT 27 MONTHS.

QUESTIONS FROM THE MINORITY

QUESTION 8. WASTE CATEGORIES

PLEASE ENUMERATE AND DESCRIBE IN A COMPREHENSIVE WAY THE KINDS OF LOW-LEVEL RADIOACTIVE WASTE IN EXISTENCE AND IDENTIFY THE REGULATORY AUTHORITY OR AUTHORITIES THAT ARE RESPONSIBLE FOR EACH KIND. HOW MUCH OF EACH KIND OF WASTE IS PRODUCED EACH YEAR - AS A PERCENTAGE OF THE TOTAL VOLUME OF WASTE AND AS A PERCENTAGE OF THE TOTAL ACTIVITY OF WASTE? HOW LONG-LIVED IS EACH KIND OF WASTE TYPICALLY? WHERE AND HOW ARE EACH OF THESE KINDS OF WASTE DISPOSED OF?

EXAMPLES OF THE KINDS OF WASTE WE ARE INTERESTED IN INCLUDE BUT ARE NOT LIMITED TO CLASSES A, B, AND C LOW-LEVEL WASTE, SCINTILLATION VIALS, ACCELERATOR-DERIVED WASTE, URANIUM DUST FROM THE FERNALD, OHIO, URANIUM FEED PLANT, WASTE FROM NAVAL SHIPYARDS, AND WASTE FROM THE WEAPONS PROGRAM.

Question 8. (Continued) 2

Answer.

Waste Categories

LLW exists in a wide variety of physical and chemical forms, as well as a broad range of radionuclide concentrations and half-lives. Typical materials comprising low-level wastes are listed below.

- Ion-exchange resins
- Solidified liquids
- Filter media
- Mechanical filters
- Compacted trash
- Noncompactable trash
- Failed equipment
- Protective Clothing
- Absorbed liquids
- Scintillation waste
- Animal carcasses
- Laboratory trash
- Contaminated soil
- Demolition rubble
- Activated metals

Low-level waste is generated by both government and commercial operations. The Department of Energy (DOE) and certain government contractors generate LLW as a result of atomic energy defense activities of the Secretary of energy. Disposal of this material is carried out by DOE on DOE reservations, and is managed by DOE under authority of the Atomic Energy Act of 1954, as amended. NRC

QUESTION 8. (CONTINUED) 3

HAS NO REGULATORY AUTHORITY OVER THE ATOMIC ENERGY DEFENSE LLW AND SUGGESTS THAT DOE BE CONTACTED FOR DETAILED INFORMATION.

DISPOSAL OF NON-DOE LLW IS REGULATED BY EITHER NRC UNDER THE AUTHORITY OF THE ATOMIC ENERGY ACT OF 1954 , AS AMENDED, OR BY AGREEMENT STATES. ABOUT HALF OF THE 2,600,000 FT^3/YR OF LLW CURRENTLY BEING SHIPPED FOR DISPOSAL COMES FROM COMMERCIAL NUCLEAR FUEL CYCLE FACILITIES. THE REMAINDER COMES FROM INSTITUTIONAL AND INDUSTRIAL ACTIVITIES SUCH AS HOSPITALS, MEDICAL SCHOOLS, UNIVERSITIES, RADIOCHEMICAL MANUFACTURERS, RESEARCH LABORATORIES, AND OTHER LICENSEES USING RADIOACTIVE MATERIAL UNDER LICENSE.

IN ADDITION, SMALL QUANTITIES OF WASTES FROM GOVERNMENT SOURCES IS ALSO DISPOSED OF IN COMMERCIAL SITES SUBJECT TO NRC AND AGREEMENT STATE REGULATION (E.G., WASTES FROM GOVERNMENT HOSPITALS, SOME WASTE FROM THE NAVAL NUCLEAR PROGRAM). THE NAVAL NUCLEAR WASTE IS SIMILAR (ALTHOUGH GENERALLY LOWER IN ACTIVITY) TO LLW FROM NUCLEAR POWER PLANTS. THE TOTAL AMOUNT OF COMMERCIAL LLW BEING DISPOSED OF IS EXPECTED TO INCREASE IN THE FUTURE WHEN NUCLEAR POWER PLANTS ARE DECOMMISSIONED. HOWEVER, GENERATION OF THIS DECOMMISSIONING WASTE IS NOT EXPECTED UNTIL AFTER THE YEAR 2000.

WASTE CONTAINING RADIOACTIVE MATERIALS NOT DEFINED BY THE ATOMIC ENERGY ACT (E.G., NATURALLY OCCURRING MATERIAL SUCH AS RADIUM-226, AND ACCELERATOR PRODUCED MATERIAL SUCH AS NA-22) ALSO EXISTS. WHILE THIS WASTE IS NOT SUBJECT TO NRC REGULATION, STATES HAVE

QUESTION 8. (CONTINUED) 4

IMPOSED REQUIREMENTS UNDER THEIR AUTHORITY TO REGULATE SUCH WASTES.

NRC'S 10 CFR PART 61 REGULATION SETS FORTH A CLASSIFICATION SYSTEM FOR LOW-LEVEL WASTE REGULATED BY NRC AND AGREEMENT STATES. THREE WASTE CLASSES ARE CURRENTLY DEFINED: A, B, AND C. EACH WASTE CLASS IS PERMITTED PROGRESSIVELY HIGHER CONCENTRATIONS OF SPECIFIC RADIONUCLIDES. THE FOLLOWING TABLE IS DERIVED FROM WASTE DISPOSAL DATA FOR 1984, AND PROVIDES THE APPROXIMATE VOLUME AND ACTIVITY PERCENTAGE IN EACH WASTE CLASS.

	WASTE VOLUME		ACTIVITY	
WASTE CLASS	(FT^3)	(%)	(CURIES)	(%)
CLASS A	2,600,000	97	23,000	5
CLASS B	54,000	2	76,000	17
CLASS C	22,000	1	340,000	78
ABOVE CLASS C		>1	?	?

LOW-LEVEL WASTES EXCEEDING THE CLASS C LIMITS ARE ESTIMATED TO COMPROMISE LESS THAN 1% BY VOLUME OF TOTAL LLW GENERATION.

COMMERCIAL WASTE DISPOSAL IS CURRENTLY BEING CARRIED OUT AT SHALLOW LAND BURIAL FACILITIES LOCATED NEAR BARNWELL, SOUTH CAROLINA; RICHLAND, WASHINGTON; AND BEATTY, NEVADA. DURING 1984, THE BARNWELL FACILITY RECEIVED APPROXIMATELY 47% OF THE WASTE, WHILE THE RICHLAND FACILITY RECEIVED ABOUT 52%. THE BEATTY FACILITY RECEIVED THE REMAINING 1% OF THE LLW SHIPPED FOR DISPOSAL.

QUESTIONS FROM THE MINORITY

QUESTION 9. JOINT EPA-NRC JURISDICTION OVER HAZARDOUS RADIOACTIVE WASTE

DESCRIBE THE APPLICABILITY OF EPA AND NRC REGULATORY AUTHORITY TO HAZARDOUS RADIOACTIVE WASTE. WHAT IS PROPOSED BY THE ADMINISTRATION TO ADDRESS THIS OVERLAP? WHAT WOULD YOU PROPOSE TO RESOLVE ANY DIFFICULTIES? WHAT OTHER OPTIONS ARE THERE? PLEASE BE SPECIFIC AS TO ANY CHANGES IN STATUTORY LANGUAGE YOU RECOMMEND.

ANSWER.

THERE IS CONSIDERABLE UNCERTAINTY OVER THE APPLICABILITY OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AND ENVIRONMENTAL PROTECTION AGENCY (EPA) REGULATIONS TO LOW-LEVEL WASTE DISPOSAL SITES REGULATED BY NRC AND AGREEMENT STATES. THESE SITES ARE REGULATED UNDER AUTHORITY OF THE ATOMIC ENERGY ACT. EXISTING NRC LICENSES WERE ISSUED UNDER SECTIONS OF 10 CFR PARTS 20, 30, 40, AND 70. NEW LOW-LEVEL WASTE DISPOSAL SITES WOULD BE LICENSED UNDER 10 CFR PART 61. SITES IN NRC AGREEMENT STATES ARE REGULATED UNDER STATE RULES COMPATIBLE WITH NRC REGULATIONS.

QUESTION 9. (CONTINUED) 2

UNCERTAINTY EXISTS REGARDING THE APPLICABILITY OF FACILITY PERMIT REQUIREMENTS THAT EPA, OR A STATE AGENCY WITH DELEGATED RCRA AUTHORITY FROM EPA, WOULD APPLY TO PERSONS LICENSED BY NRC OR AN AGREEMENT STATE AGENCY FOR LOW-LEVEL RADIOACTIVE WASTE DISPOSAL.

EPA HAS INDICATED THAT THE CURRENT LANGUAGE OF RCRA PRECLUDES EPA FROM DELEGATING ITS RCRA PERMITTING RESPONSIBILITIES TO NRC. AN INTERAGENCY MEMORANDUM OF UNDERSTANDING WOULD NOT RESOLVE UNCERTAINTIES REGARDING THE NEED TO OBTAIN RCRA PERMITS FROM EPA FOR MIXED WASTE.

CLARIFYING LEGISLATION WOULD BE THE BEST WAY TO ELIMINATE THE UNCERTAINTIES CONCERNING THE APPLICABILITY OF EPA AND NRC REGULATORY AUTHORITY. THE COMMISSION IS NOT AWARE OF ANY SPECIFIC PROPOSALS BY THE ADMINISTRATION TO ADDRESS THIS OVERLAP. WE SUPPORT THE PROVISIONS ADDRESSING THESE UNCERTAINTIES IN SECTION 15 OF H.R. 1083 AS ADOPTED BY THE HOUSE INTERIOR COMMITTEE, WITH CERTAIN ADDITIONAL CLARIFICATIONS. THE FIRST OF THESE, CONCERNING THE DELEGATION OF RCRA AUTHORITY TO NRC AGREEMENT STATES, IS ADDRESSED IN OUR RESPONSE TO QUESTION 4. THE REMAINING TWO CONCERNS ARE DISCUSSED BELOW.

FIRST, IT SHOULD BE CLEAR THAT THE DELEGATION OF AUTHORITY FOR MIXED WASTES FROM EPA TO NRC WOULD SUPERSEDE ANY PRIOR DELEGATIONS OF AUTHORITY BY EPA TO STATES TO ISSUE PERMITS THAT MAY APPLY TO NRC-LICENSED DISPOSAL FACILITIES. WITHOUT SUCH CLARIFICATION,

QUESTION 9. (CONTINUED) 3

SECTION 15 MAY BE CONSTRUED TO PROVIDE THAT NRC IS TO BE DELEGATED AUTHORITY IN ADDITION TO SUCH STATES, AND NRC OR AGREEMENT STATE-LICENSED FACILITIES WITHIN THESE STATES COULD STILL BE SUBJECT TO DUAL REGULATION.

SECOND, NO PROVISION IS MADE FOR MIXED WASTE WHICH THE NRC, UNDER SECTION 12 OF THE HOUSE INTERIOR COMMITTEE-ADOPTED BILL, IDENTIFIES AS BELOW REGULATORY CONCERN BASED ON RADIOLOGICAL HAZARD. CLARIFICATION SHOULD BE MADE THAT WASTES WHICH ARE CONSIDERED BELOW REGULATORY CONCERN FROM A RADIOLOGICAL STANDPOINT WOULD STILL BE REGULATED UNDER ANY APPLICABLE RCRA REGULATIONS.

WE BELIEVE THAT BOTH OF THESE CLARIFICATIONS CAN BE MADE THROUGH APPROPRIATE COMMITTEE REPORT LANGUAGE.

QUESTIONS FROM THE MINORITY

QUESTION 10. RESPONSIBILITY OF "ABOVE CLASS C" WASTE

WHAT IS "ABOVE CLASS C" RADIOACTIVE WASTE?

WHAT VOLUME OF WASTE IS INVOLVED? WHAT ACTIVITY?

WHO CURRENTLY HAS RESPONSIBILITY FOR ABOVE CLASS C RADIOACTIVE WASTE THAT IS NOT SPENT FUEL OR HIGH-LEVEL RADIOACTIVE WASTE? HOW DOES S. 1578 TREAT THIS TYPE OF WASTE?

WHAT ARE THE PRINCIPAL OPTIONS FOR DEALING WITH THIS WASTE? WHY SHOULDN'T THIS WASTE BE THE RESPONSIBILITY OF THE DEPARTMENT OF ENERGY FOR DISPOSAL?

ANSWER.

RESPONSIBILITY OF "ABOVE CLASS C" WASTE

"ABOVE CLASS C" WASTE IS LOW-LEVEL WASTE REGULATED BY NRC OR AN AGREEMENT STATE AND HAVING RADIONUCLIDE CONCENTRATIONS WHICH EXCEED THE CLASS C CONCENTRATION LIMITS AS DEFINED IN SECTION 61.55 OF 10 CFR PART 61. LIKE OTHER LOW-LEVEL WASTES, IT EXISTS

IN A VARIETY OF PHYSICAL AND CHEMICAL FORMS. THE TABLE BELOW CONTAINS RECENT STAFF ESTIMATES OF CURRENT AND PROJECTED ABOVE CLASS C VOLUMES. DETAILED INFORMATION ON THE TOTAL ACTIVITY OF ABOVE CLASS C WASTES HAS NOT YET BEEN COMPILED.

VOLUMES OF ABOVE CLASS C WASTES

ACTIVATED METALS	PRESENT VOLUMES	ANTICIPATED FUTURE VOLUMES
REACTOR OPERATIONS	200 FT^3/YR	200 FT^3/YR
SPENT FUEL HARDWARE (INCLUDING FUEL END FITTING)	NEGLIGIBLE	4,000 FT^3/YR*
DECOMMISSIONED REACTOR CORE COMPONENTS	NEGLIGIBLE	4,000 FT^3/ REACTOR

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* THESE FIGURES REPRESENT THE MAXIMUM VOLUMES WHICH WOULD BE GENERATED IF ALL SPENT FUEL WERE DISASSEMBLED AT REACTOR PLANTS. SUCH HARDWARE MIGHT BE CONSIDERED "SPENT FUEL" UNDER TERMS OF NWPA AND DOE'S WASTE FUND CONTRACTS, AND THUS WOULD NOT NEED FURTHER CLASSIFICATION.

QUESTION 10. (CONTINUED) 3

TRANSURANICS

Fuel Burnup Lab Operation	200 ft^3/yr	200 ft^3/yr
Fuel Burnup Lab Decommissioning	Negligible	15,000 ft^3
Plutonium Fuel Fab. Plant Decommissioning	5,000-10,000 ft^3	None
Sealed Source Manufacturing Operations	200 ft^3/yr	200 ft^3/yr
Sealed Source Manufacturing Decommissioning	2,000 ft^3	10,000 ft^3
Materials Licensee Decommissioning	Small	Small
PHARMACEUTICALS	10-50 ft^3/yr	10-50 ft^3/yr
LARGE SEALED SOURCES	Small	Small

The States currently have responsibility for disposing of waste as defined in the Low-Level Radioactive Waste Policy Act of 1980, including waste exceeding the class C limits established under

NRC'S 10 CFR PART 61 REGULATION. HOWEVER, IT IS OUR UNDERSTANDING THAT SOME STATES ARE NOW RELUCTANT TO ASSUME RESPONSIBILITY FOR DISPOSAL OF THIS WASTE. SECTION 3(A)(1) OF S. 1578 CLEARLY SPECIFIES THAT STATES WOULD ONLY BE RESPONSIBLE FOR LOW-LEVEL WASTES THAT CONSIST OF OR CONTAIN LOW-LEVEL WASTE CLASSES A, B, AND C.

WASTE EXCEEDING CLASS C LIMITS EXISTS IN A WIDE RANGE OF CONCENTRATIONS -- FROM CONCENTRATIONS THAT BARELY EXCEED CLASS C LIMITS TO CONCENTRATIONS SIMILAR TO THOSE OF CERTAIN HIGH-LEVEL WASTES. NRC BELIEVES THAT THERE MAY BE ALTERNATIVE LAND DISPOSAL METHODS FOR A PORTION OF THIS WASTE. SOME REMAINING PORTION MAY HAVE TO BE MANAGED AS HIGH-LEVEL WASTE AND DISPOSED OF IN A GEOLOGIC REPOSITORY. WE BELIEVE IT WOULD BE PREMATURE AT THIS TIME TO DETERMINE THE METHOD OF DISPOSAL FOR ALL TYPES OF ABOVE CLASS C WASTE.

THE COMMISSION BELIEVES THAT THE BEST SOLUTION WOULD BE TO CLEARLY ASSIGN RESPONSIBILITY TO DOE FOR DISPOSAL OF LOW-LEVEL WASTE EXCEEDING CLASS C CONCENTRATIONS AND TO PROVIDE DOE FLEXIBILITY TO EVALUATE ALTERNATIVE MANAGEMENT APPROACHES FOR THIS WASTE.

QUESTIONS FROM THE MINORITY

QUESTION 11. DISPOSAL CAPACITY

(A) WHAT IS THE PHYSICALLY AVAILABLE CAPACITY AT THE EXISTING COMMERCIAL LOW-LEVEL WASTE DISPOSAL SITES, BY SITE? WHAT IS THE MAGNITUDE OF THIS AVAILABLE CAPACITY IN RELATION TO THE VOLUMES BEING PRODUCED NOW?

HOW LONG COULD EXISTING LOW-LEVEL WASTE SITES ACCOMMODATE LOW-LEVEL WASTE GENERATED IN THE UNITED STATES?

ANSWER.

(A) THE NRC DOES NOT MAINTAIN RECORDS ON AVAILABLE LOW-LEVEL WASTE DISPOSAL CAPACITY IN RELATION TO COMMERCIAL WASTE GENERATION RATES. HOWEVER, 2.6 MILLION CUBIC FEET OF LOW-LEVEL WASTE WAS SHIPPED FOR DISPOSAL TO COMMERCIAL SITES IN 1984. INFORMATION ON THE ESTIMATED USABLE BURIAL AREA, UTILIZED BURIAL AREA, AND LAND USE BURIAL FACTORS ARE INCLUDED IN TABLE 4.15 ATTACHED, FROM THE DEPARTMENT OF ENERGY REPORT, SPENT FUEL AND RADIOACTIVE WASTE INVENTORIES, PROJECTIONS, AND CHARACTERISTICS (DOE/RW-0066), SEPTEMBER 1984. IT SHOULD BE NOTED THAT THE INFORMATION PRESENTED IS BASED ON LICENSED DISPOSAL CAPACITY, RATHER THAN PHYSICALLY AVAILABLE LAND WHICH MAY OR MAY NOT BE LICENSED FOR BURIAL PURPOSES IN THE FUTURE.

Table 4.15. Status of LLW disposal sites

Site	Site size[a] (ha)	Estimated total usable burial area[a] (ha)	Calculated land usage factor[a] (m³/ha)	Estimated burial area utilized through 1983 (ha)[b]
DOE/defense				
LANL	26.4	24.7	29,490	13.8
INEL	38.6	31.6	35,000	26.0[c]
NTS	42.3	0	0	0
ORNL	27.3	5.0	8,500	3.7
Hanford	>405	0	6,767	38.7[d]
SRP	78.0	72.7	11,150	38.7
Total	>600	>135		120.3
Commercial				
West Valley, NY (Closed Mar. 11, 1975)	8.9[f]	7.28	20,200	2.08
Maxey Flats, KY (Closed Dec. 27, 1977)	100	<31[h]	13,300	10.1[h]
Sheffield, IL (Closed Apr. 8, 1978)	8.9	3.08	22,630	3.9[i]
Barnwell, SC[j]	97.1[k]	46.7[k]	15,530[k]	28.1[k]
Beatty, NV	32	10.6[l]	8,130[m,n]	11.7
Richland, WA	40	33.6[m]	8,710[m]	20.6
Total	300	166.8		72.1
Grand Total	>913	>297.8		200.3

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[a] Calculated from data given in ref. 31 (for DOE) and ref. 33 (for commercial), except for Barnwell (ref. 34). Note: 1 acre = 0.405 ha.

[b] Calculated by dividing volume added in 1983 by the average land usage factor to obtain area used in 1983. This value was added to the corrected 1982 value reported in ref. 32. See also Tables 4.3 and 4.6.

[c] In addition, prior to 1970, about 3 ha was used for TRU waste which was considered to be LLW at the time of burial.

[d] This pertains to the radioactive waste management site in Area 5 of the NTS. The availability of land that could be used for shallow-land burial is not clearly defined because of the classified nature of the site and the abundance of land. A land usage factor is not applicable at NTS.

[e] There appears to be no problem in designating additional land for shallow-land burial as it is needed. Utilized land value is for 200-Areas only. If the closed 100- and 300-Area burial grounds are considered, ~16.8 ha must be added to this total.

[f] Including fuel reprocessing area. Total site is 1350 ha according to ref. 34.

[g] Based on data from ref. 12. Includes both state- and NRC-licensed burial grounds.

[h] Data from ref. 15. Area utilized value, provided by Site Manager, John E. Razor (ref. 13), includes ~1982 m³ of onsite generated LLW since closure (ref. 18).

[i] Full when closed.

[j] Limit on volume of waste accepted began in November 1979. With present schedule, available land could last until 1997; however, current compact legislation requires closure in 1992.

[k] Calculated from data given in ref. 34. Remaining usable area (28.4 ha) provided by V. R. Autry, Bureau of Radiological Health, letter to A. H. Kibbey, June 21, 1983.

[l] Calculated from data in refs. 36 and 37.

[m] Based on data given in ref. 33.

[n] This is an average value. In the last few years, deeper trenches have been used. Therefore, the current land usage factor is somewhat higher (9,230 m³/ha in 1983).

Source: DOE/RW-0006
Previously DOE/NE-0017/3

QUESTIONS FROM THE MINORITY

QUESTION 11. (B) ARE THERE ANY TECHNICAL, SAFETY, OR ECONOMIC REASONS WHY GENERATORS SHOULD ADOPT VOLUME REDUCTION TECHNOLOGIES? WHAT ARE THEY? WHAT ARE THE TRADE OFFS? ARE THERE TECHNICAL, SAFETY, OR ECONOMIC DRAWBACKS TO VOLUME REDUCTIONS? WHAT ARE THEY?

ANSWER.

(B) IN ITS OCTOBER 12, 1981 POLICY STATEMENT, COPY ATTACHED, THE COMMISSION ENCOURAGED LICENSEES TO ADOPT PRACTICES TO REDUCE THE VOLUME OF LOW-LEVEL RADIOACTIVE WASTE GENERATED AND SHIPPED TO COMMERCIAL WASTE DISPOSAL SITES. THIS INCLUDES VOLUME MINIMIZATION AS WELL AS THE USE OF VOLUME REDUCTION EQUIPMENT.

IN GENERAL, THERE ARE NO TECHNICAL REASONS FOR NOT USING VOLUME REDUCTION TECHNOLOGIES. PROVEN EQUIPMENT EXISTS FOR SORTING, SHREDDING, COMPACTING, EVAPORATING AND DRYING, INCINERATING AND OTHERWISE TREATING WASTES CONTAINING RADIOACTIVE MATERIALS.

THERE ARE BOTH ADVANTAGES AND DISADVANTAGES FROM SAFETY AND ECONOMIC STANDPOINTS USING VOLUME REDUCTION TECHNOLOGIES. FROM A SAFETY STANDPOINT, ADDITIONAL HANDLING OF WASTE MAY MEAN SOME FURTHER RADIATION EXPOSURE TO GENERATOR EMPLOYEES PERFORMING VOLUME REDUCTION OPERATIONS. ON THE OTHER HAND, SMALLER

QUESTION 11. (CONTINUED) 4

QUANTITIES OF VOLUME-REDUCED WASTES CAN IN SOME INSTANCES MEAN LESS EXPOSURE TO GENERATOR AND DISPOSAL WORKERS, AND FEWER SHIPMENTS WHICH CAN HAVE A MARGINALLY LOWER RISK TO THE PUBLIC FROM TRANSPORTATION OF THE WASTES.

ECONOMIC ADVANTAGES AND DISADVANTAGES ARE PROBABLY THE MOST SIGNIFICANT ASPECTS OF USING VOLUME REDUCTION TECHNOLOGIES. THE PRINCIPAL REASON FOR GENERATORS TO PRACTICE VOLUME REDUCTION IS TO SAVE ON THE COSTS OF DISPOSAL AND THE ATTENDANT TRANSPORTATION COSTS. THE PRINCIPAL ECONOMIC DRAWBACK IS THE COST OF ACQUIRING AND OPERATING VOLUME REDUCTION EQUIPMENT.

IT IS THE BALANCING OF THESE VARIABLES FOR DIFFERENT TYPES AND QUANTITIES OF WASTE, THE AVAILABILITY OF STORAGE CAPACITY, THE SCOPE OF GENERATOR OPERATIONS, THE MOTIVATION OF GENERATORS, AND OTHER FACTORS THAT DETERMINE WHETHER VOLUME REDUCTION IS PRACTICED BY INDIVIDUAL WASTE GENERATORS OR WASTE SERVICE PROVIDERS.

Policy Statement on Low-Level Waste Volume Reduction

AGENCY: Nuclear Regulatory Commission.

ACTION: Policy statement on low-level waste volume reduction.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) has established a policy regarding the volume reduction of low-level radioactive waste. The policy statement addresses: (1) The need for volume reduction policy; and (2) the need for waste generators to minimize the quantity of waste produced. The policy also states that NRC will take expeditious action on requests for licensing of volume reduction systems. (A copy of this notice is being sent to all licensees and state authorities to advise them of this policy.)

EFFECTIVE DATE: October 16, 1981.

FOR FURTHER INFORMATION CONTACT: Robert E. Browning, Deputy Director, Division of Waste Management, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555; Phone 301/427-4200.

SUPPLEMENTARY INFORMATION:

Policy Statement

The Commission has established the following policy:

The Commission hereby adopts a policy calling on all generators of low-level radioactive waste to reduce the volume of waste for disposal; licensees are encouraged to establish programs commensurate with good volume reduction practices.

The Nuclear Regulatory Commission (NRC) considers it desirable that licensees reduce the volume of low-level radioactive waste generated and shipped to commercial waste disposal sites. Such action would:

1. Extend the operational lifetime of the existing commercial low-level disposal sites;
2. Alleviate concern for adequate storage capacity if there are delays in establishing additional regional sites;
3. Reduce the number of waste shipments.

The Commission acknowledges the active role taken by some nuclear industry groups to encourage volume reduction practices among their membership. The increased awareness of the industry is reflected in stepped-up efforts to reduce the volumes of waste generated and by applications to implement waste processing systems by a growing number of licensees. The Commission believes that a positive statement of policy will add greater impetus and encouragement to the industry efforts already underway.

The Commission is encouraging licensees to adopt procedures that will reduce the volume of waste being transferred to disposal facilities. NRC believes it is in the best interest of licensees and the public that licensees extensively explore means by which waste volume may be reduced. The NRC views volume reduction activities as a two-step system. The first, volume minimization, is capable of immediate implementation, since it requires only a strict system of administrative controls on the part of licensee management to accomplish. The costs for an administrative controls program should be small, and these costs largely should be offset by reductions in shipping and disposal costs. The second step, if needed, would be installation of advanced equipment to achieve even greater reduction in volume than is possible through the use of administrative controls.

There are a number of means by which licensees may reduce volume through application of strict administrative controls. Some of these are: (1) Planning of laboratory and process activities prior to the actual operations; (2) provision of management control over the generation of waste to assure that all operations and plant equipment usage are conducted so as to minimize leakage, spills, and volume of waste generated; (3) improved segregation of radioactive and non-radioactive materials activities; and (4) provision of training programs to assure that personnel are thoroughly knowledgeable with laboratory and plant equipment and maintenance so as to minimize conditions which result in increased waste generation.

Apart from efforts to reduce waste volumes by administrative controls, licensees may benefit further by applying advanced volume reduction equipment in their processes.

A number of volume reduction techniques are in varying stages of development. These include, but are not limited to: (1) Incinerators; (2) evaporator-crystallizers; (3) fluidized bed dryers; (4) thin-film evaporators; (5) extruder evaporators; and (6) compactors. Waste compactors are in general use at many nuclear facilities. Extruder evaporators are being installed in some power plants, while several utilities are looking into incineration as a volume reduction process.

Treatment or disposal of licensed material by incineration requires Commission approval under 10 CFR 20.305. Other modifications required to install volume reduction equipment at reactor plants can be accomplished without prior Commission approval under 10 CFR 50.59, unless the proposed modification involves a change in the technical specifications incorporated in the license or an unreviewed safety question. Non-reactor licensees who wish to apply volume reduction equipment to their wastes should contact the appropriate NRC licensing staff for guidance regarding licensing requirements.

The NRC staff is available to consult with licensees regarding volume reduction processes. NRC staff will cooperate with licensees in assessing the state-of-the-art of methods for achievement of volume reduction, and will take expeditious action on requests for licensing volume reduction systems.

Dated at Washington, D.C., this 13th day of October 1981.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

[FR Doc. 81-[illegible] Filed 10-15-81; 8:45 am]

BILLING CODE 7590-01-M

QUESTIONS FROM THE MINIORITY

QUESTION 12. (A) WHAT IS THE ACTUAL COST (INCLUDING TRANSPORTATION) ON A PER CUBIC FOOT BASIS OF LOW-LEVEL WASTE DISPOSAL UNDER CURRENT NRC REGULATIONS.

ANSWER.

THE NRC STAFF HAS OBTAINED CURRENT RATE SCHEDULES FROM CHEM-NUCLEAR SYSTEMS, INC. AND U.S. ECOLOGY FOR THE BARNWELL, SOUTH CAROLINA AND HANFORD, WASHINGTON SITES, RESPECTIVELY. (SEE ENCLOSURES A AND B.) TRANSPORTATION COSTS DEPEND ON THE DISTANCE OF THE SHIPMENT AND WHETHER THE WASTE IS SHIELDED OR UNSHIELDED. TYPICAL COSTS ARE SUMMARIZED IN TABLES 17-20 IN ENCLOSURE C FROM "AN ANALYSIS OF LOW-LEVEL WASTE DISPOSAL FACILITY AND TRANSPORTATION COSTS." NATIONAL LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT PROGRAM, DOE/LLW-6TD, APRIL 1983.

QUESTIONS FROM THE MINORITY

QUESTION 12. (B) WHAT NON-COST CHARGES ARE CURRENTLY APPLIED TO LOW-LEVEL WASTE DISPOSAL BY EACH OF THE STATES WITH EXISTING SITES?

ANSWER.

SURVEILLANCE AND LICENSE FEES FROM WASHINGTON, SOUTH CAROLINA AND NEVADA ARE PRESENTED IN ENCLOSURE D TO THE MATERIAL WHICH FOLLOWS THE ANSWER TO THIS QUESTION.

QUESTIONS FROM THE MINORITY

QUESTION 12. (C) WHAT IS THE RELATION OF THESE COSTS TO THE SURCHARGES PROPOSED UNDER S. 1578?

ANSWER.

SECTION 5(I) OF S. 1578 LISTS THE FOLLOWING SURCHARGES:

TIME PERIOD	SURCHARGE ($/CUBIC FOOT)
1986-1987	10
1988-1989	20
1990-1992	40

THE STATUTORY SURCHARGES CANNOT BE RELATED TO THE COST OF DISPOSAL OF LLW BECAUSE THE LATTER CHARGES VARY CONSIDERABLY DEPENDING ON THE CHARACTERISTICS OF THE WASTES. SEE ENCLOSURES A-D.

QUESTION 12. (CONTINUED) 4

QUESTIONS FROM THE MINORITY

QUESTION 12. (D) HOW MUCH DOES EACH SITED STATE TAKE IN FROM LOW-LEVEL WASTE CHARGES?

ANSWER.

FOR 1985, THE SITED STATES EXPECT THE REVENUES AS SHOWN IN ENCLOSURE D:

STATE	TOTAL REVENUES FROM LLW CHARGES (APPROXIMATE)
WASHINGTON	$11 MILLION
SOUTH CAROLINA	$9.6 MILLION
NEVADA	$96 THOUSAND

QUESTION 12. (CONTINUED) 5

QUESTIONS FROM THE MINORITY

QUESTION 12. (E) WHAT DO THESE STATES DO WITH THE REVENUE THEY GENERATE FROM LOW-LEVEL WASTE CHARGES?

ANSWER.

THE REVENUES AND HOW THEY ARE USED IN THE STATES ARE SHOWN IN ENCLOSURE D.

Enclosure A

CHEM-NUCLEAR SYSTEMS, INC.
220 Stoneridge Drive • Columbia, South Carolina 29210

BARNWELL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITY RATE SCHEDULE

All radwaste material shall be packaged in accordance with Department of Transportation and Nuclear Regulatory Commission regulations in Title 49 and Title 10 of the Code of Federal Regulations, CNSI's Nuclear Regulatory Commission and South Carolina Radioactive Material Licenses, CNSI's Barnwell Site Disposal Criteria, and amendments thereto.

1. BASE DISPOSAL CHARGES (Not including Surcharges and Barnwell County Business License Tax)

A.	Standard Waste	$ 24.94/ft.^{3}
B.	Biological Waste	$ 25.94/ft.^{3}
C.	Special Nuclear Material (SNM) plus $1.75 per Gram SNM	$ 24.94/ft.^{3}

Note: Minimum charge per shipment, excluding Surcharges and specific Other Charges is $800.00.

2. SURCHARGES

A. Weight Surcharges (Crane Loads Only)

Weight of Container	Surcharge Per Container
0 - 1,000 Lbs.	No Surcharge
1,001 - 5,000 Lbs.	$ 275
5,001 - 10,000 Lbs.	$ 550
10,001 - 20,000 Lbs.	$ 825
20,001 - 30,000 Lbs.	$ 1,100
30,001 - 40,000 Lbs.	$ 1,650
40,001 - 50,000 Lbs.	$ 2,200
Greater than 50,000	By Special Request

B. Curie Surcharge

Curie Content Per Shipment	Surcharge Per Shipment
0 - 1	No Surcharge
1.1 - 5	$ 1,800
5.1 - 15	$ 2,250
15.1 - 25	$ 3,000
25.1 - 50	$ 4,500
50.1 - 75	$ 5,800
75.1 - 100	$ 7,450
100.1 - 150	$ 8,900
150.1 - 250	$ 12,000
250.1 - 500	$ 15,000
500.1 - 1,000	$ 18,000
1,000.1 - 5,000	$ 24,000
Greater than 5,000	By Special Request

Effective April 15, 1988

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C. Special Handling Surcharge may apply on unusually large or bulky containers. These type containers are acceptable upon approval of prior request.

. OTHER CHARGES

A.	Cask Handling Fee	$ 600 per cask, minimum
B.	Taxes and Special Funds	
1.	Perpetuity Escrow Fund	$ 2.80 per ft.^{3}
2.	South Carolina Low-Level Radioactive Waste Disposal Tax (Educational [illegible] Act)	$ 4.00 per ft.^{3}
3.	Southeast Regional Compact Fee	$ 0.29 per ft.^{3}
4.	Barnwell County Business License Tax	

A 2.4% Barnwell County Business License Tax shall be added to the Total of all disposal fees.

NOTE: Items 3.B. 1, 2 and 3 are included in Item 1, Base Disposal Charges.

. MISCELLANEOUS

A. Transport vehicles which are provided with additional shielding features may be subject to a minimum handling fee of $150.00 per use. Such a fee covers additional handling and labor required for special equipment set-up and temporary shield removal.

B. Decontamination services (if required): $75.00 per man-hour plus supplies at current CNSI rate.

C. Customers may be charged for all special services as described in the Barnwell Site Disposal Criteria.

D. Terms of payment are NET 30 DAYS upon presentation of invoices. A service charge per month of 1-1/2% shall be levied on accounts not paid within thirty (30) days.

Effective April 15, 1985

E. Company purchase orders or a written letter of authorization in form and substance acceptable to CNSI shall be received before receipt of radioactive waste material at the Barnwell Disposal Site and shall refer to CNSI's Radioactive Material Licenses, the Barnwell Site Disposal Criteria, and subsequent changes thereto.

F. All shipments shall receive a CNSI allocation number and conform to the Prior Notification Plan. Additional information may be obtained at (803) 259-3577 or (803) 259-3578.

. Miscellaneous (Cont.)

G. This Rate Schedule is subject to change and does not constitute an offer of contract which is capable of being accepted by any party.

H. A charge of $5,000 is applicable to all shipments which require special site set-up for waste disposal.

I. Class B/C waste received with chelating agents which requires separation in the trench, may be subject to a surcharge if Stable Class A waste is not available for use in achieving the required separation from other wastes.

Effective April 15, 1985

[illegible]

US ECOLOGY
WASHINGTON NUCLEAR CENTER
SCHEDULE OF CHARGES
RADIOACTIVE WASTE

USEcology

EFFECTIVE: August 1, 1985

1. DISPOSAL CHARGES

A. SOLID MATERIAL

Steel Drums, Wood Boxes:

R/HR AT CONTAINER SURFACE	PRICE PER CU. FT.
0.00 - 0.20	$22.14
0.201 - 1.00	23.79
1.01 - 2.00	26.36
2.01 - 5.00	27.56
5.01 - 10.00	32.07
10.01 - 20.00	40.88
20.01 - 40.00	50.08
40.01 - 60.00	71.32
60.01 - 80.00	85.11
80.01 - 100.00	93.66

Disposal Liners Removed from Shield: (Greater than 12.0 cu. ft. each)

R/HR AT CONTAINER SURFACE	SURCHARGE PER LINER	PRICE PER CU. FT.
0.00 - 0.20	No Charge	$22.14
0.201 - 1.00	$ 229.74	22.14
1.01 - 2.00	564.30	22.14
2.01 - 5.00	791.82	22.14
5.01 - 10.00	1,145.35	22.14
10.01 - 20.00	1,462.08	22.14
20.01 - 40.00	1,815.62	22.14
40.01 - 60.00	2,153.54	22.14
60.01 - 80.00	2,484.76	22.14
80.01 - 100.00	2,822.60	22.14

B. LIQUID WASTES

1. In vials, less than 50 ml. each	$28.30/cu.ft.
2. Liquids containing organics, absorbed	28.30/cu.ft.
3. Aqueous liquids, absorbed	22.14/cu.ft.

C. BIOLOGICAL WASTE, ANIMAL CARCASSES 33.79/cu.ft.

(Continued)

INCLUDED IN ITEM 1 ARE THE FOLLOWING WASHINGTON STATE FEES:

A.	PERPETUAL CARE AND MAINTENANCE	$1.75 PER CU. FT.
B.	SITE CLOSURE FUND	0.25 PER CU. FT.
C.	RADIOACTIVE WASTE SURVEILLANCE SURCHARGE	0.45 PER CU. FT.

2. SURCHARGE FOR HEAVY OBJECTS:

Less than 10,000 pounds	No Charge
10,000 pounds to Capacity of Site Equipment	$172.70 plus 9¢ per lb. above 10,000 lbs.

3. SURCHARGE FOR CURIES (Per Load):

Less than 100 curies	No Charge
100 - 300 curies	$1,257.30 plus 17¢/Ci above 100
301 - License Limits	By Request

4.	SURCHARGE FOR SPECIAL NUCLEAR MATERIAL (SNM)	$2.37 per gram of Special Nucle Material by Isotope Weight
5.	MINIMUM CHARGE PER SHIPMENT	$387.00
6.	CASK HANDLING FEE:	$638.00 minimum each
7.	WASTE CONTAINING CHELATING AGENTS IN PACKAGES AMOUNT GREATER THAN 1% OF PACKAGE VOLUME:	By Request
8.	SURCHARGE FOR NON-ROUTINE MAN-REM EXPOSURE (DUE TO DESIGN OR PHYSICAL DEFECT OF CONTAINER OR SHIELD)	$23.71 per man millirem
9.	DECONTAMINATION SERVICES (If required)	$86.15 per man hour plus supplies at cost plus 21%

10. CONTAINER VOLUMES:

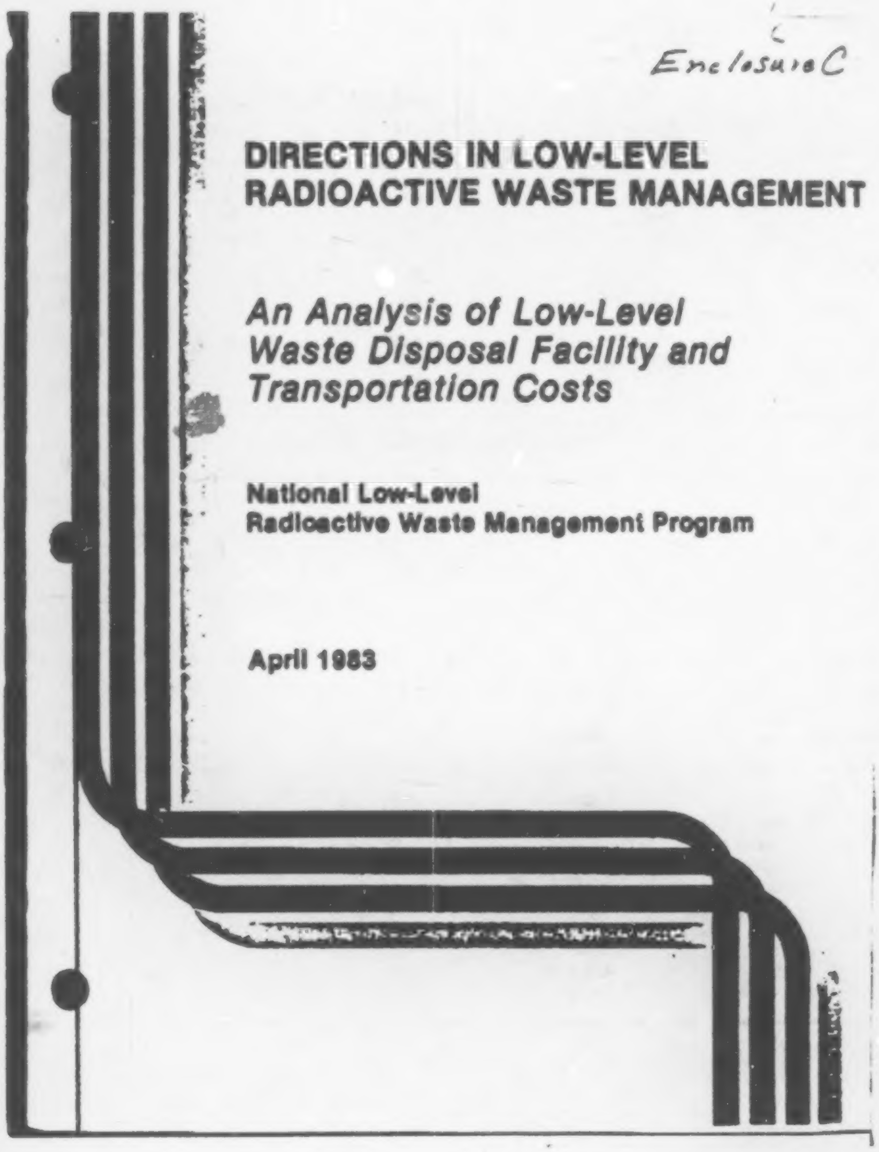
55 Gallon Drums - 7.50 cu.ft.
30 Gallon Drums - 4.01 cu.ft.
5 Gallon Drums - 0.67 cu.ft.

11. All waste material shall be properly classified, described, packaged, marked, labeled, and certified in accordance with all applicable Federal, State, and Local laws, rules and regulations and shall be in compliance with all license requirements and amendments thereto applicable at the Richland, Washington disposal facility.

12. This Schedule of Charges does not constitute an offer of contract which is capable of being accepted by any party and is subject to change solely upon notice by US Ecology.

Effective August 1, 1985
Washington Nuclear Center

Enclosure C



DIRECTIONS IN LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

An Analysis of Low-Level Waste Disposal Facility and Transportation Costs

National Low-Level
Radioactive Waste Management Program

April 1983

TABLE 17. TRUCK SHIPPING RATES--UNSHIELDED SHIPMENTS

Distance (one-way miles)	Rates Per Mile East[a] ($)	Rates Per Mile West[a] ($)
100	4.53	4.76
200	3.01	3.30
300	2.49	2.80
400	2.15	2.48
500	1.87	2.21
750	1.66	2.01
1000	1.50	1.86
1500	1.50	1.79
2000	1.50	1.73
2499+	1.50	1.67

---

a. East and west denote shipments east and west of the Mississippi River.

TABLE 18. TRUCK SHIPPING RATES--SHIELDED SHIPMENTS

Distance To Disposal Site (miles)	Round-Trip Mileage	Nationwide Rates ($ per mile)	Number of Days (cask rental)
100	200	3.25	2
200	400	2.36	2
300	600	1.87	3
400	800	1.59	3
500	1000	1.46	3
750	1500	1.37	5
1000	2000	1.37	5
1500	3000	1.37	7
2000	4000	1.37	9
2499+	4998+	1.37	11+

TABLE 19. CALCULATED TRUCK SHIPMENT CHARGES PER CUBIC FOOT OF UNSHIELDED WASTE

Distance (one-way miles)	Nonreactor Waste East ($)	Nonreactor Waste West ($)	Reactor Waste East ($)	Reactor Waste West ($)
100	0.45	0.48	0.91	0.95
200	0.60	0.66	1.20	1.32
300	0.75	0.84	1.49	1.68
400	0.86	0.99	1.72	1.98
500	0.93	1.11	1.87	2.21
750	1.25	1.51	2.49	3.02
1000	1.50	1.86	3.00	3.72
1500	2.25	2.69	4.50	5.37
2000	3.00	3.46	6.00	6.92
2499+	3.75+	4.17+	7.50+	8.35+

TABLE 20. CALCULATED TRUCK SHIPMENT CHARGES FOR SHIELDED WASTE

Distance to Disposal Site (miles)	Round-Trip Mileage	Cask Rental Fee ($)	Nationwide[a] Rates ($ per cubic foot)
100	200	500	7.67
200	400	500	9.63
300	600	750	12.48
400	800	750	13.48
500	1000	750	14.73
750	1500	1250	22.03
1000	2000	1250	26.60
1500	3000	1750	39.07
2000	4000	2250	51.53
2499+	4998+	2750+	63.98+

---

a. Applies to reactor and nonreactor waste shipments.

Department of Social and Health Services. Washinton
Comparison of Low-Level Waste Fees in States with Disposal Sites
September 5, 1985

tate of Washington	South Carolina	Nevada
urveillance Fees		
Authorized by SB3799 @ 65¢ ft^3 based on 1.359,000 ft^3 = \$883,350	License fee \$175,000 (includes environmental monitoring, site surveillance, regulatory/licensing)	
The 65¢ breaks down to: Disposal Surveillance 24¢ Environmental Monitoring 10.1¢ Washington State Patrol 4.3¢ Radiological Public Health 23.6¢ WDOE Lease Cost 3.0¢	Perpetual care and maintenance @ \$2.80 ft^3 = \$3,360,000 (based on 1,200,000 ft^3)	Site Operator License fee = \$41,318
icense Fees	Closure/stabilization fund (this interest-bearing account has \$2.3 million in the fund. The fund was collected from disposal revenues a number of years ago during a one-year period. This fund is reviewed on a periodic basis and adjusted as necessary by the state of South Carolina. This amount is not included in the total fee).	
Perpetual Care and Maintenance @ \$1.75 ft^3 = \$2,378,250		Long term care and Maintenance @ 25¢/ft^3 = \$10,000
Closure Fund @ 25¢ ft^3 = \$339,750		Generator Permit Fee @ \$2,219/yr for 17-20 permits = \$44,380
WDOE Lease Fees = \$6,000		
1500 site use permits @ \$150 = \$225,000	Site Use Permits 130 Permits @ \$50 or \$500 depending on waste and and amount = \$50,000	
Permit Fee Includes:		
WDOE to operate Northwest Comact \$169,000/yr	Compact Fee @ 42¢ ft^3 = \$504,000	
Legislative Activities in Low-Level Waste \$25,000/yr	Educational Finance @ \$4.00 ft^3 = \$4,800,000	
DSHS Permit Administrative Costs \$30,000/yr	Tax 2.4% of total disposal ~~fee paid to Barnwell County.~~ (1,200,000 ft^3 @ \$24.94) = \$718,272)	
Business and Occupational Tax to General Fund @ 30% = \$7,500,000		

Enclosure 2

QUESTIONS FROM THE MINORITY

QUESTION 13. (A) HOW MANY STATES HAVE INDICATED THAT THEY CAN MEET THE MILESTONES IN S. 1578? WHAT STATES CANNOT? WHY NOT?

ANSWER.

THE REPRESENTATIVES OF THE MIDWEST, CENTRAL AND CENTRAL-MIDWEST COMPACTS INDICATED IN CONGRESSIONAL HEARINGS ON OCTOBER 8, 1985, THAT THEY COULD MEET THE MILESTONES IN S. 1578. IN ADDITION, REPRESENTATIVES FROM THE STATES OF TEXAS AND MAINE LIKEWISE INDICATED THAT THE MILESTONES COULD BE MET. OTHER COMPACTS AND STATES DID NOT TESTIFY AT THAT HEARING AND NRC STAFF HAS NO DIRECT INFORMATION FROM THEM CONCERNING MEETING THE MILESTONES. HOWEVER, NRC STAFF OBSERVES THE FOLLOWING.

FIRST, WITH RESPECT TO COMPACTS, THE NORTHEAST COMPACT WAS ENACTED BY FOUR STATES AND HAS BEEN INTRODUCED INTO THE U.S. HOUSE OF REPRESENTATIVES. ALSO, THE DISTRICT OF COLUMBIA HAS PETITIONED TO BECOME A MEMBER OF THAT COMPACT. THE MILESTONE CONCERNED WITH SELECTION OF A HOST STATE AND SITE DEVELOPMENT IS DETERMINED BY THE MANAGEMENT PLAN WHICH HAS YET TO BE COMPLETED. MARYLAND AND DELAWARE ARE STILL ELIGIBLE TO JOIN THE APPALACHIAN COMPACT AND MAY IN THE FUTURE JOIN IT WHILE RELINQUISHING MEMBERSHIP IN THE NORTHEAST COMPACT. THE APPALACHIAN COMPACT HAS PASSED ONE HOUSE

OF THE PENNSYLVANIA LEGISLATURE AND IS UNDER CONSIDERATION IN THE OTHER. UNDER THAT COMPACT, PENNSYLVANIA WOULD HOST A DISPOSAL FACILITY. WEST VIRGINIA HAS ENACTED THIS COMPACT. THE DAKOTA COMPACT WAS ENACTED BY NORTH DAKOTA. HOWEVER, SOUTH DAKOTA MEMBERSHIP IS SUBJECT TO A SPECIAL ELECTION TO BE HELD NOVEMBER 12, 1985. IF SOUTH DAKOTA FAILS TO JOIN, NORTH DAKOTA WILL SEEK MEMBERSHIP IN THE ROCKY MOUNTAIN COMPACT. THE WESTERN COMPACT WAS CONSIDERED IN THE LEGISLATURE OF CALIFORNIA WHICH, UNDER THAT COMPACT, WOULD HOST A DISPOSAL FACILITY. HOWEVER, THE CALIFORNIA LEGISLATURE RECESSED UNTIL JANUARY 1986 WITHOUT PASSING A COMPACT BILL. ARIZONA HAS ENACTED THE WESTERN COMPACT. MEETING THE MILESTONES IN S. 1578 DEPENDS UPON HOW QUICKLY THESE COMPACTS ARE ENACTED AND SITES ARE DEVELOPED.

WITH RESPECT TO THE OTHER STATES (NEW YORK, MASSACHUSETTS, VERMONT, NEW HAMPSHIRE, AND RHODE ISLAND) COMPACT MEMBERSHIP IS NOT RESOLVED OR IS NOT BEING PURSUED. WE UNDERSTAND THAT NEW YORK IS NOW WORKING ON LEGISLATION THAT WOULD AUTHORIZE DEVELOPMENT OF A DISPOSAL FACILITY. THE SITUATION IN MASSACHUSETTS APPEARS UNCERTAIN. ANY SITING IN MASSACHUSETTS, AS WELL AS THE ENACTMENT OF A COMPACT, IS SUBJECT TO VOTER APPROVAL. WE DO NOT HAVE ANY SUBSTANTIVE INFORMATION REGARDING PUERTO RICO, THE VIRGIN ISLAND, AND THE TRUST TERRITORIES. A TABLE AND MAP INDICATING THE COMPACT STATUS AS OF OCTOBER 1985 ARE ENCLOSED.

INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMPACTS

LEGISLATIVE STATUS AS OF OCTOBER 11, 1985

Northwest (S.356 H.R. 862)	Central (S. 655 H.R. 1046)	Midwest (S. 899 H.R. 2635)	Southeast (S. 44 H.R. 1267)	Northeast (H.R. 3372)	Appalachian
Alaska - e	Arkansas - e	Indiana - e	Alabama - e	Connecticut - e	Pennsylvania -i (1)
Hawaii - e	Kansas - e	Iowa - e	Florida - e	Delaware - e	West Virginia - e
Idaho - e	Louisiana - e	Michigan - e	Georgia - e	Maryland - e	
Montana - e	Nebraska - e	Minnesota - e	Mississippi - e	New Jersey - e	
Oregon - e	Oklahoma - e	Missouri - e	North Carolina - e	Washington, DC - p	
Utah - e		Ohio - e	South Carolina - e		
Washington - e		Wisconsin - e	Tennessee - e		
			Virginia - e		

Western	Rocky Mountain (S. 442 H.R. 2702)	Central - Midwest (S. 802 H.R. 2062)	Dakota	Unaffiliated States
Arizona - e	Colorado - e	Illinois - e	North Dakota - e	Maine
California	Nevada - e	Kentucky - x	South Dakota - e (3)	Massachusetts
	New Mexico - e			New Hampshire
	North Dakota - e (4)			New York (2)
	Wyoming - e			Rhode Island
				Texas (2)
				Puerto Rico
				Vermont
				Virgin Islands

Key

e - Enacted
i - Introduced
p - Has petitioned to join
x - Signed by Executive Order

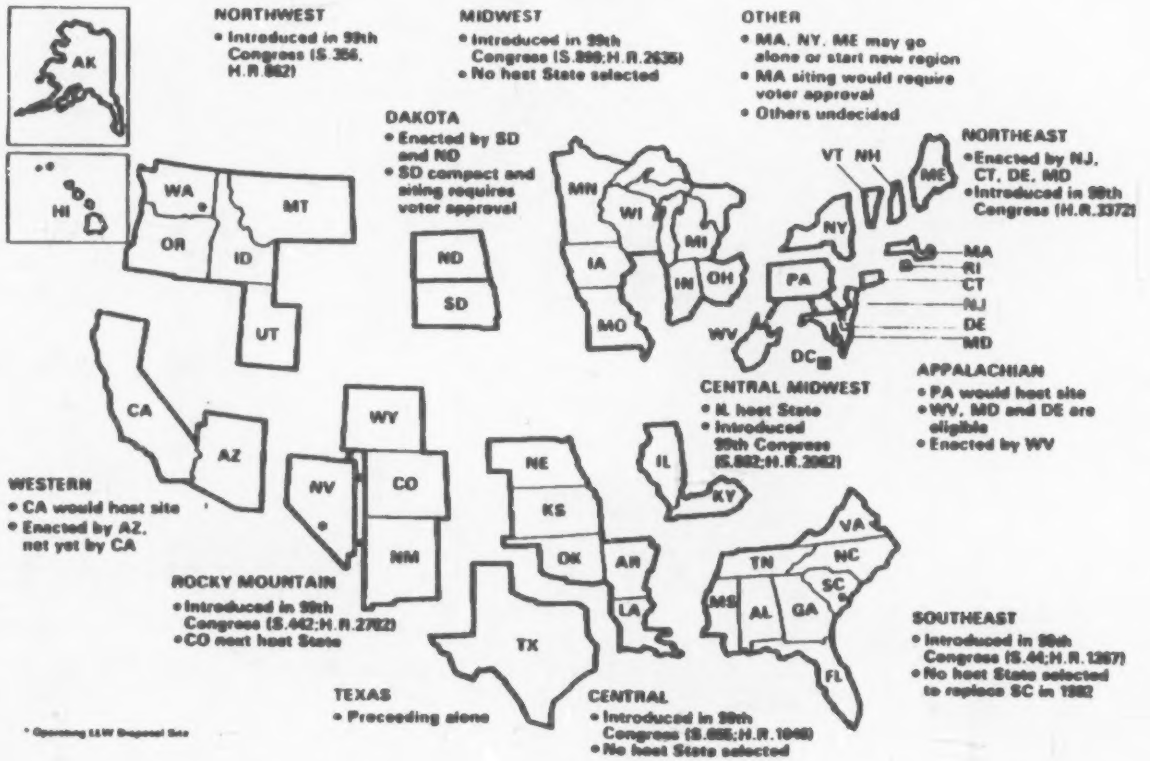
Notes:

(1) Other eligible States are MD and DE.
(2) Texas and New York are each actively planning sites of their own.
(3) Also requires voter approval in November 1985.
(4) Voted in as eligible by the Board. Legislature enacted Rocky Mountain should Dakota Compact fail.

Prepared by Office of State Programs, NRC

LOW-LEVEL RADIOACTIVE WASTE COMPACT STATUS

OCTOBER 1985


NORTHWEST
• Introduced in 99th Congress (S.356, H.R.862)
MIDWEST
• Introduced in 99th Congress (S.899;H.R.2635)
• No host State selected
OTHER
• MA, NY, ME may go alone or start new region
• MA siting would require voter approval
• Others undecided
DAKOTA
• Enacted by SD and ND
• SD compact and siting requires voter approval
NORTHEAST
• Enacted by NJ, CT, DE, MD
• Introduced in 99th Congress (H.R.3372)
APPALACHIAN
• PA would host site
• WV, MD and DE are eligible
• Enacted by WV
CENTRAL MIDWEST
• IL host State
• Introduced 99th Congress (S.802;H.R.2062)
WESTERN
• CA would host site
• Enacted by AZ, not yet by CA
ROCKY MOUNTAIN
• Introduced in 99th Congress (S.442;H.R.2702)
• CO next host State
TEXAS
• Proceeding alone
CENTRAL
• Introduced in 99th Congress (S.655;H.R.1046)
• No host State selected
SOUTHEAST
• Introduced in 99th Congress (S.44;H.R.1267)
• No host State selected to replace SC in 1992
AK
HI
WA
OR
ID
MT
UT
CA
AZ
NV
WY
CO
NM
ND
SD
NE
KS
OK
TX
AR
LA
MN
IA
MO
WI
MI
IL
IN
OH
KY
WV
PA
NY
VT
NH
ME
MA
RI
CT
NJ
DE
MD
DC
VA
NC
SC
TN
GA
AL
MS
FL

* Operating LLW Disposal Site

QUESTION 13. (CONTINUED) 3

QUESTIONS FROM THE MINORITY

QUESTION 13: (B) WHAT WILL HAPPEN IN THESE STATES IF MILESTONES ARE NOT MET? BE AS SPECIFIC AS POSSIBLE.

ANSWER.

THE TERMS OF ACCESS TO EXISTING SITES WITH EXISTING FACILITIES MIGHT RESULT IN WASTE GENERATORS IN UNSITED REGIONS HAVING TO STORE WASTE, ENGAGE IN VOLUME REDUCTION TECHNIQUES AND/OR CEASE WASTE GENERATION. GENERATOR RESTRICTIONS COULD PLACE A REGULATORY BURDEN ON THE NRC AND AGREEMENT STATES IN RESPONDING TO INDIVIDUAL LICENSEE NEEDS FOR LICENSE AMENDMENTS.

QUESTIONS FROM THE MINORITY

QUESTION 14. ENFORCEMENT OF MILESTONES

UNDER S. 1578, WHEN A MILESTONE IS MISSED THE GENERATORS IN THAT STATE LOSE ACCESS TO THE EXISTING DISPOSAL SITES. YET, THE FAILURE TO MEET THE MILESTONE IS REALLY THE FAULT OF THE POLITICIANS AND BUREAUCRATS IN THE STATE WHO, PRESUMABLY HAVE NOT COMPLIED WITH FEDERAL LAW.

(A) WHY SHOULDN'T THE PENALTY FOR MISSING A MILESTONE BE BORNE BY THE ONES WHO FAILED TO MEET IT, RATHER THAN BY THE GENERATORS WHO ARE NOT IN CONTROL OF THE SITING PROCESS?

ANSWER.

(A) RECOGNIZING THE POTENTIAL IMPACTS ON PUBLIC HEALTH AND SAFETY FROM A LOSS OF DISPOSAL SITE ACCESS BY WASTE GENERATORS, THE NRC HAS RECOMMENDED THAT ALTERNATIVE PENALTIES BE CONSIDERED. THE COMMISSION SUPPORTS THE CONCEPT EMBODIED IN H.R. 1083 AS REPORTED BY THE HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS. UNDER THAT BILL, A STATE MISSING THE 1990 MILESTONE WOULD CERTIFY THAT THEY WOULD ACCEPT RESPONSIBILITY FOR MANAGEMENT OF LOW-LEVEL

WASTES GENERATED WITHIN ITS BORDERS AFTER 1992. NRC HAS FURTHER RECOMMENDED THAT THE STATE'S CERTIFICATION BE BACKED BY BINDING CONTRACTS OR OTHER LEGALLY ENFORCEABLE MECHANISMS BETWEEN THE CERTIFYING STATE AND WASTE GENERATORS OR OWNERS, AND THAT SUCH STATES PREPARE PLANS FOR IMPLEMENTING THE INTENT OF THE CERTIFICATIONS. THE NRC BELIEVES THESE MEASURES WOULD APPROPRIATELY PLACE RESPONSIBILITY FOR MISSED MILESTONES WITH THE STATES.

QUESTION 14: (B) PLEASE COMMENT ON THE FOLLOWING OPTIONS FOR DEALING WITH SITUATIONS WHERE MILESTONES ARE MISSED:

- VEST TITLE TO WASTE GENERATED AFTER MISSING THE MILESTONE IN THE GOVERNOR OF THE STATE THAT MISSED THE MILESTONE.

REQUIRE THE STATE MISSING THE MILESTONE TO PAY SURCHARGES FOR CONTINUED ACCESS FOR ITS GENERATORS.

- ALLOW THE GENERATORS TO SUE THE GOVERNOR OF THE STATE THAT MISSES A MILESTONE FOR DAMAGES FROM LOST ACCESS.

- WHAT OTHER OPTIONS WOULD YOU RECOMMEND THE COMMITTEE CONSIDER TO ENFORCE THE MILESTONES?

ANSWER.

(B) AS NOTED ABOVE, THE COMMISSION SUPPORTS A REQUIREMENT THAT STATES MISSING THE 1990 MILESTONE CERTIFY THAT THEY WILL MANAGE WASTES GENERATED IN THEIR STATE AFTER 1992. WE HAVE RECOMMENDED SEVERAL PROVISIONS TO BETTER ENSURE THAT STATE RESPONSIBILITIES UNDER THE CERTIFICATION WILL BE CARRIED OUT, AND WE WOULD SUPPORT FURTHER MEASURES TO HELP ACHIEVE THIS RESULT.

QUESTION 14. (CONTINUED) 4

CONSISTENT WITH OUR POSITION THAT STATES MANAGE THEIR WASTE AFTER 1992 REGARDLESS OF PROGRESS TO ESTABLISH NEW DISPOSAL CAPACITY, WE WOULD SUPPORT LANGUAGE TO VEST TITLE TO THE WASTE IN SUCH STATES NO LATER THAN THE CLOSE OF 1992. WE FURTHER BELIEVE STATES SHOULD BE PREPARED TO TAKE CUSTODY OF THE WASTE BY THAT DATE, AND SHOULD DEVELOP REALISTIC IMPLEMENTATION PLANS TO BE IN THE POSITION TO DO SO. WHILE STATE CUSTODY OF THE WASTE PRIOR TO 1993 IS NOT CONSIDERED NECESSARY, IT MAY BE APPROPRIATE TO TRANSFER TITLE AT AN EARLIER DATE.

WE BELIEVE THERE IS MERIT IN THE CONCEPT OF HAVING THE RESPONSIBLE PARTIES, THE STATES, PAY THE COSTS (SURCHARGES) ASSOCIATED WITH MISSING MILESTONES. IN ITS COMMENTS ON THE AMENDED H.R. 1083 AS REPORTED BY THE HOUSE INTERIOR COMMITTEE, THE COMMISSION RECOMMENDED THAT STATE CERTIFICATIONS BE BACKED BY LEGALLY ENFORCEABLE INSTRUMENTS. WE BELIEVE ANY SUCH REMEDIES SHOULD BE TIED TO THE CERTIFICATION PROCESS RATHER THAN DIRECTLY TO THE MILESTONES. WE ALSO BELIEVE EXPLICIT LANGUAGE IDENTIFYING THE TYPE AND EXTENT OF DAMAGES WHICH MAY BE RECOVERED SHOULD BE CONSIDERED.

QUESTIONS FOR MINORITY

QUESTION 15. GO IT ALONE STATES

SHOULD THE LEGISLATION REPORTED BY THE COMMITTEE INCLUDE PROVISION FOR STATES THAT WANT TO PROVIDE FOR THEIR OWN LOW-LEVEL WASTE DISPOSAL, BUT FOR NO ONE ELSE'S? WHY OR WHY NOT? WHAT SHOULD THE PROVISION SAY?

ANSWER.

THE COMMISSION HAS NOT TAKEN A POSITION ON THIS ISSUE. WHATEVER CHANGES CONGRESS MAKES WE HOPE THAT THE BASIC POLICY ENCOURAGING REGIONAL SOLUTIONS WOULD NOT BE UNDERMINED. REGIONAL SITES ARE PREFERABLE FROM A PUBLIC HEALTH AND SAFETY STANDPOINT TO A PROLIFERATION OF SMALLER, AND POSSIBLY ECONOMICALLY MARGINAL FACILITIES.

QUESTIONS FROM THE MINORITY

QUESTION 16: Low Level Waste Definition

Please provide the Committee with a suitable legal definition of low-level waste for the purposes of the amendments to the Low-Level Waste Policy Act under consideration in the Committee.

ANSWER.

The Commission recommends the following legal definition of low-level waste for purposes of the S. 1578 amendments to the Low-Level Radioactive Waste Policy Act.

Sec.2(13)

LOW-LEVEL RADIOACTIVE WASTE.--The term 'low-level radioactive waste' means radioactive material, whether or not subject to the provisions of the Atomic Energy Act of 1954, as amended, that ___

(A) is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or byproduct material [as defined in Section 11e(2) of the Atomic Energy Act of 1954 [42 A.S.C. 2014(e)(2)] as in effect on January 1, 1985]; and

QUESTION 16. (CONTINUED) 2

(B) THE NUCLEAR REGULATORY COMMISSION, CONSISTENT WITH EXISTING LAW, CLASSIFIES AS LOW-LEVEL RADIOACTIVE WASTE.

THE ADDED LANGUAGE IS INTENDED TO PROVIDE A STATUTORY BASIS FOR ASSIGNMENT OF DISPOSAL RESPONSIBILITY FOR NATURALLY-OCCURRING AND ACCELERATOR-PRODUCED RADIOACTIVE MATERIALS (NARM) WASTES. CURRENTLY, THESE WASTES ARE NOT SUBJECT TO THE ATOMIC ENERGY ACT.

Department of Energy
Washington, DC 20585

November 6, 1985

Honorable Pete V. Domenici
Chairman, Subcommittee on Energy
  Research and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On October 8, 1985, Acting Assistant Secretary James Vaughan and William Voigt appeared before the Energy and Natural Resources Subcommittee on Energy Research and Development and the Environment and Public Works Subcommittee on Nuclear Regulation to discuss Senate bills S. 1517 and S. 1578; bills to amend the Low-Level Radioactive Waste Policy Act of 1980.

Following that hearing, you submitted written questions for our response to supplement the record. Enclosed for your information are the answers to those questions, which also have been sent directly to the Committee staff.

If you have any questions, please have your staff call Hank Edler or Cathy Hamilton on 252-4277. They will be happy to assist.

Sincerely,

Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosures

POST-HEARING QUESTIONS AND ANSWERS
RELATING TO THE
OCTOBER 8, 1985 HEARING
BEFORE THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT

WITNESS: JAMES W. VAUGHAN, JR.
ACTING ASSISTANT SECRETARY FOR NUCLEAR ENERGY
U.S. DEPARTMENT OF ENERGY

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 1: (a) The Department of Energy is offering technical expertise to the compact regions and States in fulfilling their responsibilities. What specific technical assistance is DOE providing to the States?

Answer: DOE provides technical assistance to the States and regions by: (a) planning and conducting technology development and demonstration projects; (b) developing and providing comprehensive decision analysis programs; (c) providing and maintaining an integrated data base of historical waste disposal volumes, waste characteristics and projections of future waste types and volumes; and (d) assembling and distributing technical information to support specific disposal facility siting and development activities.

To ensure the timely provision of technical assistance to States and regions, DOE and its contractor representatives frequently meet with representatives of the States and compact regions, attend compact meetings, meet with officials to assist in the development of specific plans and documents, convene joint Federal and State working groups to address specific issues, and as necessary assign personnel to assist State and regional organizations. These activities are generally complementary to ongoing research efforts directed at improving the management and disposal of the Department's low-level waste.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 1: (b) How much money is in DOE's budget for providing technical assistance to compact regions for development of low-level wastes sites?

Answer: The FY 1986 budget for this program is $4.75 million for direct technical support to the States (see answer to question 1(a)).

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 1: (c) How does a State obtain such assistance?

Answer: Any State or region seeking technical or other consultative assistance from the Department may contact the Low-Level Radioactive Waste Management Program within the DOE Office of Nuclear Energy.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 1:	(d) Congressman Markey has introduced an amendment to H.R. 1083 that would return a portion of the surcharge fee to states that meet the required milestones. Wouldn't it be perhaps more appropriate to direct these funds through DOE, and then channel them back to states, via grants and technical assistance, as needed, so that the money can be applied where it is needed the most?
Answer:	DOE supports the concept of applying State resources specifically for the development of new low-level waste disposal capacity. Since establishment of disposal capacity is a State responsibility, the allocation of funds should be the responsibility of the State. DOE recommends that funds be directed primarily toward disposal site selection and facility development, and that demonstrating tangible progress toward specific schedules be included as a major criterion for receiving such support.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 1: (e) Would you elaborate on your statement that "direct financial assistance to compact regions and states will not contribute significantly to the formation of additional compacts?"

Answer: The Department believes that States and regions must significantly increase their efforts to develop new disposal facilities. For this reason, the Department supports the milestones and requirements for meeting them being considered by Congress. However, DOE believes that additional time and direct financial assistance will not resolve the institutional issues that have impeded compact formation for the past 5 years. Additionally, the Department feels that Federal support of State and regional disposal facility development activities should be limited to the provision of information, technical assistance, and the development of improved technologies for treating, packaging and disposing of low-level waste.

In this regard, DOE can provide meaningful assistance in helping States and regions select and characterize sites, evaluate appropriate waste treatment and disposal technologies, and design facilities to meet their specific requirements. The capital cost of facility development should be the responsibility of the State or compact region.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 2:	Are there any Federal agency wastes disposed of at commercial sites? What are they?
Answer:	Federal low-level radioactive waste that is not generated by DOE has been disposed at commercially operated sites for over 20 years. This Federal waste totals some 79,000 cubic feet annually, or about 2 percent of the 2.6 million cubic feet of the total waste disposed of at commercially operated facilities each year. Federal waste not generated by DOE is primarily produced as a result of medical and laboratory research, medical diagnosis and treatment, and the operation of Navy and National Bureau of Standards nuclear reactors. Laboratory waste is generated by the Department of Agriculture, Department of Defense, Department of Health and Human Services (National Institutes of Health, Center for Disease Control, and Food and Drug Administration), Environmental Protection Agency, National Aeronautics and Space Administration, National Bureau of Standards, and the Veterans Administration. Medical waste is generated by the Department of Defense (Army, Navy, Air Force), the Department of Health and Human Services, and the Veterans Administration. Most low-level radioactive waste from

Answer 2
(continued): non-DOE Federal medical and laboratory research and development is no different in most cases from low-level radioactive waste produced by research and development performed by private companies, hospitals, or universities.

Low-level radioactive waste from routine operation of Department of Defense nuclear reactors is very similar to that produced by commercial nuclear powerplants.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 3:	What would you suggest as the additional incentives and/or penalties--besides increased disposal fees or loss of access to a disposal site--for the state to manage their low-level waste if the milestones are not met?
Answer:	According to the proposed legislation, compact regions would have to select a host State for a disposal facility by January 1, 1988. Both compact regions and States would also be required to develop a siting plan by January 1, 1988. By January 1, 1990, a license application would have to be submitted to the Nuclear Regulatory Commission (NRC). The Department believes that it would require at least 2 years to properly characterize a site and to prepare a license application. Therefore, the 1988 milestone could be replaced with a more stringent requirement such that the actual disposal site be selected by January 1, 1988. If a State has not identified its site (either within a compact region or individually) by January 1, 1988, it should provide a plan as to how it will provide storage or disposal capacity for its waste by 1990.

Answer 3
(continued): This recommendation allows the States and compact regions an additional 2 years beyond the 1986 requirement in the Low-Level Radioactive Waste Policy Act in order to select a disposal site or to determine some other course of action. If a site cannot be selected by 1988, then an additional 2 years is provided for the States to pursue an alternative course for meeting their responsibilities to provide for the availability of disposal capacity. Those States and regions that can meet the required milestones would have until December 31, 1992, to develop their facilities.

As an additional strengthening measure, States or compact regions that have not met the required milestones and still wish to have access to operating disposal sites could be required to pay any penalty, rather than the waste generators.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 4: Would you elaborate on the problem of non-utility low-level waste in relation to the availability of disposal capacity during the transition period? Has anyone at DOE run through calculations to determine how much volume would be left for non-utility waste? How does this compare with historical volumes?

Answer: The impact of disposal caps (being considered in low-level waste legislation) on a national and individual generator basis is difficult to assess due to the flexibility allowed in S. 1517 and the uncertain schedule for new commercial nuclear power reactors commencing operation. Predicting future impacts is further compounded by the fact that one of the purposes of the disposal caps is to change past waste management practices, thereby reducing the overall volume of waste disposed.

A general analysis of the potential impact that the proposed disposal caps might have has been conducted based on past disposal volumes and current waste management practices. The conclusions from this analysis are:

National Impact

The minimum projected 7-year total disposal allocation (being considered in proposed legislation) for the three operating low-level waste disposal sites of 19.6 million cubic feet compares to a projected total for waste generated of 27.2 million cubic feet, thereby requiring a 28 percent

Answer 4
(continued): reduction in the waste shipped for disposal from all generators. The overall impact could actually be less due to the potential delays in new reactor startup dates.

Nuclear Power Reactors

The projected impact on pressurized and boiling water reactors differs. The cumulative 7-year impact for current and projected reactors disposing of an average amount of waste (in cubic feet) each year based on historical averages appear in Table 1.

(The information follows:)

Answer 4
(continued):

Table 1

PROJECTED IMPACT OF DISPOSAL VOLUME
CAPS ON DIFFERENT REACTOR TYPES

	Cumulative Disposal Cap (million cubic feet)	Cumulative Projected Amount of Waste Generated (million cubic feet)	Volume Reduction Required (Percent)
Sited Regions			
PWRS	2.1	3.2	33
BWRs	1.9	2.4	22
Sited Region Total	4.0	5.6	28
Unsited Regions			
PWRs	3.5	5.4	36
BWRs	5.0	8.4	40
Unsited Regions Total	8.5	13.8	39
REACTOR TOTAL	12.5	19.4	36

Answer 4 (continued): Assuming that each reactor disposes of the maximum allowable waste over the period 1986-1992 and that new reactors are licensed according to estimates contained in the Department's February 1985 report to Representative Udall (see "Considerations for Evaluating Proposed Low-Level Radioactive Waste Compacts," (DOE/NE-0058)), then the total disposal capacity used by commercial nuclear power reactors is estimated to be 12.5 million cubic feet for the period 1986-1992.

Non-Reactor Generators

Subtracting the total amount of waste anticipated to be disposed of by reactors for the period 1986-1992 (12.5 million cubic feet) from the total capacity available (19.6 million cubic feet) leaves 7.1 million cubic feet of disposal capacity available for non-reactor generators. On average, this would be 1.1 million cubic feet per year for each of the 7 years in question. The historical annual average for the past 3 years for non-reactor generators has been 1.2 million cubic feet. Therefore, a 17 percent reduction in non-reactor waste volumes from the historical (3 year) average would be required to meet the objectives of the proposed allocation system currently in the proposed legislation. Such a reduction requirement could be offset by delays in reactor construction or volume reduction efforts in the non-reactor sector. However, any growth in the non-reactor sector could exacerbate this situation.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 5: (a) You have suggested that in section 4(b)(2), the word Federal government "produced" be changed to "owned." Does the word "owned" adequately cover all waste generated by Federal contractors?

Answer: The change requested by the Department to replace the word "produced" to "owned" in section 4(b)(2) is not intended to cover all waste generated by Federal contractors. The section deals with the rights of the compact regions to regulate waste disposal facilities within their jurisdictions. Specifically, section 4(b)(2) would effectively exclude facilities operated by the Department, since DOE is the only organization that operates facilities exclusively for the disposal of low-level radioactive waste "owned" by the Federal Government. DOE has, on rare occasions, accepted waste at a DOE facility for disposal that has been produced by other organizations. Therefore, we have requested this clarifying change in the language.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 5: (b) You have mentioned the DOD wastes that are disposed of at commercial facilities. I assume you are referring to wastes from Navy shipyards. What percentage of the commercial waste comes from these shipyards? Which shipyards are located in non-sited regions?

Answer: Low-level wastes are generated by the industrial, operational, and medical programs of all the Armed services, not just naval shipyards.

In 1984, Naval shipyards disposed of approximately 23,000 cubic feet of low-level radioactive waste at commercial disposal sites. An additional 5,000 cubic feet of waste was generated by two civilian shipyards engaged in construction and servicing of naval nuclear powered ships and by servicing facilities other than shipyards. In the past 5 years, wastes from all these sources averaged between 24,000 and 34,000 cubic feet annually. The volume varies with the tempo of ship operation and servicing. Although the Navy takes stringent measures to reduce the total volume of waste produced, this annual total may increase in the future as the number of nuclear ships increase. The 1984 total of 28,000 cubic feet represents approximately one percent of all the wastes disposed of at commercially operated facilities. Two naval shipyards--the Portsmouth Naval Shipyard in Kittery, Maine, and the Mare Island Naval Shipyard in Vallejo, California--are located in non-sited regions. In addition, naval facilities in Groton and New London, Connecticut, and San Diego, California--where small amounts of waste from operations and servicing are generated--are also located in non-sited regions.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 6: You support the preparation of an annual comprehensive report of waste generation, transportation, and management, and you have mentioned that such a data base will take time to develop. However, you would only support the need for such a report during the 7-year transition period. Do you believe the continuation of such a report, once the data base has been set up, would enhance our efforts in future waste management?

Answer: We have suggested that an annual report during the 7-year transition period would keep both Congress and the States informed of the progress being made by the States and interstate compact regions toward the development of new disposal capacity. The need for additional reports to Congress should be examined in 1992 after completion of the 7-year transition period.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 7: As far as you are aware, do the words in section 4(b)(3) and section 4(b)(4) adequately protect existing federal authority? Where a compact may grant new authority to state that is in conflict with Federal jurisdictions, will this language negate such authority? Will the compact's validity be in question if it is not reratified in conformance with the Low-Level Waste Bill?

Answer: The language in section 4(b)(3) and section 4(b)(4) of Amendment 583 adequately protects DOE interests.

While unable to respond to the effect of these provisions on other Federal agencies, we note that the Department of Justice has expressed some concern about the compacts and stated in an October 5, 1984, letter to Senate Judiciary Committee Chairman Strom Thurmond that:

> "... some of the compacts contain provisions that could engender what may prove to be nettlesome litigation...particularly with respect to the substantive and procedural law that will govern actions taken by the various compact commissions."

However, the Justice Department was addressing certain individual compacts prior to the introduction of Amendment 583, which specifically provides at section 4(b)(4) that:

> "Nothing contained in this Act or any compact may be construed to limit the applicability of any Federal law or to diminish or otherwise impair the jurisdiction of any Federal agency, including the regulatory responsibilities of the Nuclear Regulatory Commission and the Department of Transportation."

Answer 7
(continued): There is clear precedent on the issue of the validity of an interstate compact that has been conditionally consented to by Congress and has not subsequently been formally ratidied by the involved States. The States' actions indicating acceptance of the conditions set by Congress may be sufficient to establish the validity of the compact.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 8: How closely does DOE monitor low-level waste generation nationwide? Would it be appropriate to charge DOE with the responsibility of assigning unusual volume allocations (Section 5(g) of Thurmond bill)? It seems to me that this allocation should be made by a non-biased third party who has the information necessary to make such a determination.

Answer: Federal agencies, including DOE, do not monitor the generation of low-level waste nationwide on a regular basis. The Department has attempted to gather such information through statewide surveys of approximately 20,000 radioactive material licensees. One such survey was completed in 1982 and another is currently being conducted by the Conference of Radiation Control Program Directors. Response to these surveys is voluntary and therefore the data are somewhat incomplete.

The Department and other agencies and States do, however, monitor the amount and characteristics of waste that is disposed. Mechanisms are being implemented by the Department in cooperation with several States and regions to collect this information on an automated basis and make it readily available to all interested parties.

Answer 8 (continued): The Department supports the concept of an unbiased third party acting to assign unusual volume allocations and agrees that such party should have full access to waste disposal information to support allocation decision. Selection of such an arbiter should be sensitive to the needs of host States, the facility operators, and waste generators. The Department believes that there are several alternatives to accomplish such assignments, including a committee comprised of (1) host States and facility operators, (2) a Federal agency, or (3) either group supplemented by an advisory committee. None of these alternatives should conflict with any established regulatory requirements.

QUESTIONS SUBMITTED BY CHAIRMAN PETE V. DOMENICI

Question 9: Does DOE have the capability to monitor the actual annual volumes of wastes accepted at all three disposal sites, especially to determine if distribution of waste has been evenly allocated?

Answer: DOE presently monitors annual disposal volumes and waste characteristics for wastes shipped to the three commercially operated sites. We plan to continue to provide this level of information to all interested parties. The Department is currently working with the State of South Carolina to develop and implement a system to monitor the volumes of waste received against the allocation system provided for in current proposed congressional legislation. Based on the information to be collected by this system, the Department or other interested organizations could evaluate national disposal trends. Additionally, the system could be used to assist in making waste allocation decisions.

QUESTIONS FROM THE MINORITY

Waste Categories

Question 1: Please enumerate and describe in a comprehensive way the kinds of low-level radioactive waste in existence and identify the regulatory authority or authorities that are responsible for each kind. How much of each kind of waste is produced each year - as a percentage of the total volume of waste and as a percentage of the total activity of waste? How long-lived is each kind of waste typically? Where and how are each of these kinds of waste disposed of?

Examples of the kinds of waste we are interested in include but are not limited to classes A, B, and C low-level waste, scintillation vials, accelerator-derived waste, uranium dust from the Fernald, Ohio, uranium feed plant, waste from naval shipyards, and waste from the weapons program.

Answer: Low-level radioactive waste disposal in the United States is regulated by one of the following organizations: (1) the U.S. Nuclear Regulatory Commission; (2) NRC Agreement State agencies; (3) States, for non-Atomic Energy Act naturally occurring and accelerator produced radioactive material (NARM) waste; and (4) the Department of Energy.

The Department self regulates waste that is generated from DOE activities and is responsible for its proper disposal. The NRC or an NRC Agreement State agency regulates the disposal of low-level waste except for such waste generated by Department of Energy operations and NARM waste. NARM waste is regulated by the States, but the responsibility for disposal of this material is not assigned under existing law.

Answer 1
(continued): Low-level waste comes primarily from four sectors in the United States: (1) nuclear utility and fuel cycle handling; (2) industrial and radiopharmaceutical manufacturing; (3) medical research and treatment; and (4) Federal Government activities. Based on disposal volumes reported for 1984, each sector was responsible for the following volume percentage of the 2.6 million cubic foot total, respectively: category (1), 64 percent; category (2), 30 percent; category (3), 4 percent; and category (4), 3 percent. (These figures do not equal 100 percent due to rounding.)

A comprehensive description of the kinds, amounts, characteristics and history of low-level waste disposed in the U.S. may be found in Chapter 4 of the attached DOE publication, "Spent Fuel and Radioactive Waste Inventories, Projections and Characteristics" (DOE/RW-0006).

(The information follows:)

QUESTIONS FROM THE MINORITY

Joint EPA/NRC Jurisdiction over Hazardous Radioactive Waste

Question 2: Describe the applicability of EPA and NRC regulatory authority to hazardous radioactive waste. What is proposed by the Administration to address this overlap? What would you propose to resolve any difficulties? What other options are there? Please be specific as to any changes in statutory language you recommend.

Answer: DOE defers to the EPA and NRC regarding regulatory authority over hazardous radioactive waste. The Department considers the provisions of Section 15 of H.R. 1083, as reported out of the House Interior and Insular Affairs Committee and modified by a section that would broaden the provisions to include the States under NRC oversight, to adequately address and resolve this issue.

QUESTIONS FROM THE MINORITY

Responsibility of "Above Class C" Waste

Question 3: What is "above Class C" radioactive waste? What volume of waste is involved? What activity? Who currently has the responsibility for above Class C radioactive waste that is not spent fuel or high-level radioactive waste? How does S. 1578 treat this type of waste? What are the principal options for dealing with this waste? Why shouldn't this waste be the responsibility of the Department of Energy for disposal?

Answer: "Above Class C" or greater-than-Class C waste consists of radioactive waste materials with radionuclide concentrations exceeding the Class C limits established by the NRC in 10 CFR Part 61.55. Greater-than-Class C wastes include activated metals from nuclear reactor decommissioning and fuel hardware; waste materials containing transuranic elements above minimal concentrations from decommissioning of facilities that produce or use plutonium; waste from the manufacture of pharmaceuticals; and large sealed sources.

Greater-than-Class C waste that cannot be disposed as low-level waste is currently being held in storage. The volume of such waste is estimated to amount to less than 1 percent of the 2.6 million cubic feet of low-level radioactive waste disposed in 1984 at commercially operated sites. Annual amounts of greater-than-Class C waste should not increase until significant reactor decommissioning occurs after the year 2000. The NRC has estimated that for reactor

Answer 3
(continued): decommissioning, each PWR will generate 4700 cubic feet of greater-than-Class C waste and each BWR will generate 1700 cubic feet of greater-than-Class C waste. The total volume of greater-than-Class C waste estimated for scheduled reactor decommissioning is 380,000 cubic feet, over the years 2000 through 2025.

According to the Low-Level Radioactive Waste Policy Act, States are responsible for providing for the availability of capacity for the disposal of low-level radioactive waste--including greater-than-Class C waste--generated within their borders (except for certain Federal waste). Thus, radioactive waste determined by the NRC to be acceptable for land disposal under 10 CFR Part 61, including greater-than-Class C wastes, is the responsibility of the States. S. 1578 would exclude greater-than-Class C waste from State responsibility. It also would require DOE to prepare a report setting forth recommendations to ensure the safe disposal of any radioactive waste for which disposal is not provided under other Federal law or disposal as low-level waste is not viable.

Answer 3
(continued): The principal options for dealing with greater-than-Class C waste center on whether the States or the Federal Government should have ultimate disposal responsibility. The Department has recommended that it conduct a study to identify the characteristics of greater-than-Class C wastes affected before recommending options--both Federal and non-Federal--for the continued safe and environmentally acceptable disposal of these wastes. This approach would also explore several issues related to disposal of greater-than-Class C waste, including capital funding requirements, site selection issues, and disposal charges. It would be inappropriate to add non-DOE waste to DOE's existing disposal sites since the DOE sites are dedicated to wastes from DOE's national security and other mission-oriented activities. Additionally, we do not believe that assigning this waste to DOE would ease the institutional difficulties that are associated with siting new low-level radioactive waste management facilities.

QUESTIONS FROM THE MINORITY

Disposal Capacity

Question 4: What is the physically available capacity at the existing commercial low-level waste disposal sites, by site? What is the magnitude of this available capacity in relation to the volumes being produced now? How long could existing low-level waste sites accommodate low-level waste generated in the United States? Are there any technical, safety, or economic reasons why generators should adopt volume reduction technologies? What are they? What are the trade offs? Are there technical, safety, or economic drawbacks to volume reduction? What are they?

Answer: Using current estimates of facility land area available (from "Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics," DOE/RW-0006) and relying on routine trench depths and disposal practices for each facility, a general estimate of the collective licensed capacity remaining at these facilities is 23.4 million cubic feet. Of this total licensed capacity, 19 percent is estimated to be at Hanford, 8 percent at Beatty, and 72 percent at Barnwell. The availability of the remaining capacity is subject to some restrictions by the host States in terms of rate of use, acceptance of certain types of waste, and inspection requirements.

The 1984 national total of low-level waste generated was reported to be 2.6 million cubic feet from all sectors. Based on this annual disposal volume, the remaining capacity

Answer 4 (continued): after 1984 would be adequate for approximately 9 years, not allowing for increases due to the operation of new facilities.

The selection of waste treatment technologies for a specific waste stream would be based on a comprehensive analysis by waste generator of the potential costs and benefits of any such technology. Considerations must be given by the generator to financial costs, health risks, reductions in the radiological and nonradiological hazard of the waste, and the long term environmental ramifications of the treatment method. A more thorough analysis of these issues would have to be conducted in order to respond in depth to this question. The Department and others (such as the Electric Power Research Institute) have begun studies in this area. A summary of currently available information on waste volume reduction provided to Congressman Udall in July 1985 is enclosed. In general, long-term environmental impacts from migration of radioactive waste can be reduced or better controlled when prior waste treatment is used in conjuction with improved waste forms.

(The information follows:)

Overview of Achievements in Waste Volume Reduction

Question

"Provide an overview of achievements in waste volume reduction that have been implemented recently, on a national level and by various types of waste generators. What kinds of volume reduction can be achieved in the future, assuming various levels of disposal cost?"

Response

Nationally, the volume of radioactive waste shipped to commercially operated disposal facilities has decreased by 4 percent between January 1979 and December 1983, while the number of operating reactors has increased. The nonreactor sector achieved a 23 percent reduction. Reactor waste shipped for disposal increased overall by 15 percent; this increase was totally attributable to new reactors coming on line. On a per megawatt basis, reactor low-level waste shipped for disposal decreased by 5 percent. Table 4 summarizes these volume reductions.

TABLE 4. LOW-LEVEL WASTE VOLUME DISPOSED 1979—1983 VOLUME (CUBIC FEET)

	1979	1983	%Change
Total Volume	2,822,000	2,709,000	- 4
Volume from Nonreactors	1,418,000	1,095,000	- 23
Volume from Reactors	1,404,000	1,614,000	+ 15
Total Rated Reactor Power, Megawatts	48,168	58,118	+ 21
Reactor Waste Volume/Megawatt	29.15	27.77	- 5

Factors that have influenced this trend reduction are increasing disposal costs and changes in disposal regulations. From 1979 to 1983 net disposal prices have increased by a factor of four-to-five, from approximately $5.00/cubic foot in 1979 to a range of $20.00-to-$25.00 in 1984. Various volume reduction measures have been taken over this 5-year period, by both reactor and nonreactor generators. These improvements have become cost-effective as disposal costs increase. Additionally, regulatory changes for some wastes produced by medical and research institutions have allowed these generators to dispose of some wastes as nonradioactive waste.

Future volume reductions can also be expected to be driven by increasing disposal costs or by new regulatory requirements. As shown in Table 4, some volume reduction has already been achieved. Future increases in disposal cost or changes in regulations may not achieve the same magnitude of volume reduction. For some waste streams, significant investment is required to install new equipment that may result in only a small decrease in waste volume. In such cases, the law of diminishing returns applies. New equipment and procedures can be expected to be utilized when the cost imposed by increasing disposal prices exceeds the cost to build, install, operate, and maintain new volume reduction equipment and procedures. Typically, the low- and moderate-cost improvements which result in volume reduction have already been implemented. The cost to build, install, operate, and maintain new equipment and procedures will vary, depending on the specific equipment, size of equipment, and type and volume of waste being processed. Decisions to institute a volume reduction program will depend on each generator's specific cost basis for evaluating the breakeven point. Therefore, increases in disposal prices will not impact all generators equally, nor could any increase in cost be expected to produce reasonably predictable waste reductions on a per generator basis.

Some analysis of increasing disposal prices on volume reduction options has been conducted for reactor plants by the Electric Power Research Institute (see Figures 1 and 2).

As shown in Figures 1 and 2, the benefit from volume reduction (VR) varies for boiling water and pressurized water reactors. Additionally, the benefits from boiling water reactors will depend upon the type of cleanup system used.

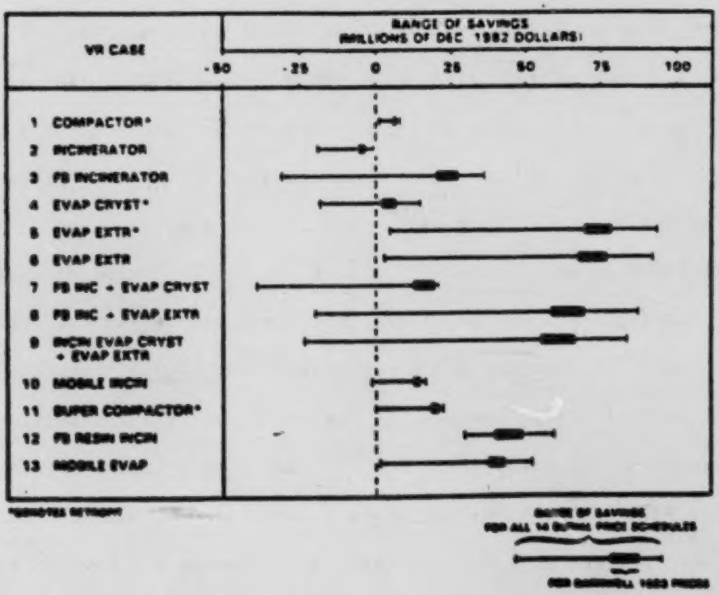


Figure 1. Range of Savings for all Volume Reduction Cases—Twin Boiling Water Reactors with Deep-Bed Condensate Polishing System. Source: Long-Term, Low-Level Radwaste Volume Reduction Strategies, Vol. 2 Economic Analysis, EPRI NP-3763.

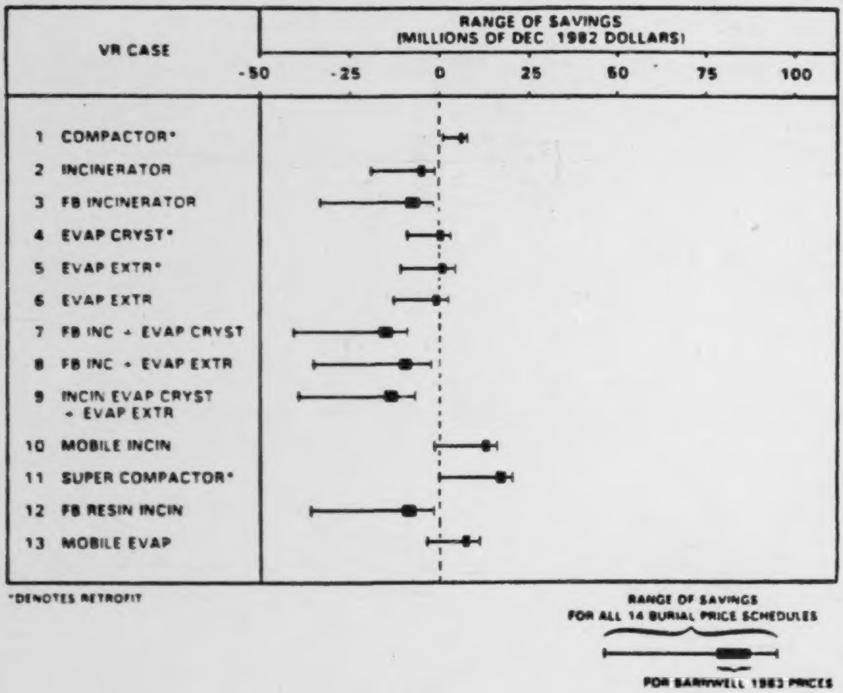


Figure 2. Range of Savings for all Volume Reduction Cases--Twin Pressurized Water Reactors with No Condensate Polishing System. Source: Long-Term, Low-Level Radwaste Volume Reduction Strategies, Vol. 2 Economic Analysis. EPRI NP-3763.

Several viable technologies capable of producing significant reductions in low-level radioactive waste volumes are available in the commercial sector. Several more technologies are also being marketed or developed that treat low-level waste to produce improved waste disposal characteristics with minor decreases in volume; in some cases treatment methods can result in increased waste volume. Many companies are actively positioning themselves in the market to provide a variety of equipment and services to low-level waste generators, primarily the utilities. Table 5 presents a partial listing of several types of volume reduction systems that are available through various vendors of volume reduction services or equipment.

TABLE 5. VOLUME REDUCTION SYSTEMS CURRENTLY AVAILABLE

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1. High Pressure Compactor
2. Stationary Incinerators
3. Fluid Bed Dryer/Incinerator
4. Evaporator Crystallizer
5. Evaporator Extruder
6. Mobile Incinerator
7. Ultra High Pressure Compactor
8. Mobile Thin-Film Evaporator

Source: Long-Term, Low-Level Radwaste Volume Reduction Strategies, Electric Power Research Institute, EPRI NP-3763, Vol. 1, November 1984.

The emergence of a mobile incinerator for the concentration of dry active waste and a portable, ultra high force super-compactor for the compaction of both combustible and noncombustible dry waste represent two alternatives that require no extensive capital outlay by the generator. Both technologies can provide volume reductions on the scale of 10 to 1, 100 to 1, or greater, depending on the type of waste. These services can be provided to customers at large. Several other service organizations have informally expressed that they intend to provide similar reduction services at existing facilities, through more conventional brokerage arrangements.

QUESTIONS FROM THE MINORITY

Costs

Question 5: What is the actual cost (including transportation) on a per cubic foot basis of low-level waste disposal under current NRC regulations. What non-cost charges are currently applied to low-level waste disposal by each of the States with existing sites? What is the relation of these costs to the surcharges proposed under S. 1578? How much does each sited States take in from low-level waste charges? What do these States do with the revenue they generate from low-level waste charges?

Answer: Costs for disposal of low-level waste vary depending on the facility utilized. Present base fees per cubic foot for the disposal of low-level waste are $17.85 for Barnwell, South Carolina; $17.85 for Beatty, Nevada; and $19.49 for Hanford, Washington. In addition to these base fees, extra charges may be required for radioactivity levels, site closure costs and long-term site maintenance and monitoring costs. They may also be required for extra handling, shielding, weight or other special services that would be necessary for disposal. Beyond these surcharges that are based on the physical characteristics of the waste, some host States assess other fees and taxes. Present State surcharges per cubic foot are estimated to be $4.89 for South Carolina, $3.50 for Nevada, and $0.27 for Washington. These surcharges have historically approached 25 percent of the base fee for some facilities.

Answer 5
(continued): Transportation costs are not included in this base fee and will vary depending on the waste generator's proximity to the disposal facility. The minimum cost for transporting low-level waste is less than one cent per cubic foot per mile, but could be considerably greater than this amount if additional shielding or handling are necessary. For most Class A waste, transportation costs are small relative to disposal fees.

The imposition of a $10 to $40 surcharge as proposed in S. 1578 would represent a 25 percent to 230 percent increase in overall disposal costs borne by the waste generators.

Annual revenues obtained through State imposed surcharges may be as high as $6 million for South Carolina, $365,000 for Washington, and $98,000 for Nevada. These are computed estimates based on reported 1984 volumes and general surcharge levels. These estimates may be different than the actual revenues received by the respective States and may vary for any specific year.

We do not have information regarding how these states use the revenues they generate from low-level waste charges.

QUESTIONS FROM THE MINORITY

Milestones

Question 6:	How many States have indicated that they can meet milestones in S. 1578? What States cannot? Why not? What will happen in these States if milestones are not met?
Answer:	To our knowledge there has been no major disagreement with the milestones in S. 1578 among responsible State and regional authorities.

If milestones ultimately are not met by the States and compact regions, it is likely their generators will eventually lose access to existing disposal facilities. If this event were to occur, there is no further guidance in S. 1578 to resolve the problem. Individual generators or States could petition the "sited" States for continued access privileges or could make other arrangements for the storage or disposal of their wastes. However, the Low-Level Radioactive Waste Policy Act provides that it is Federal policy that each State is responsible for providing for the availability of capacity for the disposal of low-level radioactive waste generated within its borders except for certain Federal waste. If access to existing disposal sites was terminated, waste generators would likely turn to their respective States for resolution of the disposal issue.

QUESTIONS FROM THE MINORITY

Enforcement of Milestones

Question 7: Under S. 1578, when a milestone is missed the generators in that state lose access to the existing disposal sites. Yet the failure to meet the milestone is really the fault of the politicians and bureaucrats in the state who, presumably have not complied with federal law. Why shouldn't the penalty for missing a milestone be borne by the ones who failed to meet it, rather than by the generators who are not in control of the siting process? Please comment on the following options for dealing with situations where milestones are missed:

- o Vest title to waste generated after missing the milestone in the Governor of the state that missed the milestone.
- o Require the state missing the milestone to pay surcharges for continued access for its generators.
- o Allow generators to sue the Governor of the state that misses a milestone for damages from lost access.

What other options would you recommend the Committee consider to enforce the milestones?

Answer: Our testimony before the Subcommittee recognized this same issue. We recommended that Congress clarify the specific responsibilities of States for managing their low-level waste if the milestones were not met.

In making this recommendation, we noted the problem of penalizing the waste generator if a State or region does not meet its schedule, either by loss of access to a disposal site, increased disposal fees, or both. The general approach taken by Senator McClure in his substitute bill to S. 1517 penalizes the States if milestones are not met.

DOE views the options contained in the question as being consistent with the policy of State responsibility established in the Low-Level Radioactive Waste Policy Act.

QUESTIONS FROM THE MINORITY

Go-It-Alone States

Question 8: Should the legislation reported by the Committee include provision for States that want to provide for their own low-level waste disposal, but for no one else's? Why or why not? What should the provision say?

The Low-Level Radioactive Waste Policy Act states--

> "...(i)t is the policy of the Federal Government that...low-level radioactive waste can be most safely and efficiently managed on a regional basis."

Nothing in the Act requires that States join a regional compact. We see no reason for enacting special provisions that may encourage a compact member to withdraw from a compact.

QUESTIONS FROM THE MINORITY

Low-Level Waste Definition

Question 9: Please provide the Committee with a suitable legal definition of low-level waste for the purposes of the amendments to the Low-Level Waste Policy Act under consideration in the Committee.

Answer: The Department recommends that the following definition for low-level radioactive waste contained in Public Law 97-425, "The Nuclear Waste Policy Act of 1982," be used.

(The definition follows:)

> "The term 'low-level radioactive waste' means radioactive material that--
>
> (A) is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or by-product material as defined in section 11(e)(2) of the Atomic Energy Act of 1954 (52 USC 2014(e)(2); and
>
> (B) the (Nuclear Regulatory) Commission, consistent with existing law, classifies as low-level radioactive waste."

CALIFORNIA
RADIOACTIVE MATERIALS
MANAGEMENT FORUM

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October 28, 1985

The Honorable Pete V. Domenici
Chairman, Subcommittee on Energy
  Research and Development
Senate Committee on Energy and
  Natural Resources
Room 317, Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator Domenici,

On behalf of the CAL RAD FORUM, I am pleased to submit the following comments in response to your letter of October 16th with follow-up questions. CAL RAD appreciates the attention that you, your subcommittee, and your staff have devoted to the important question of disposal of low-level radioactive waste which affects so many of our institutions and so much of our economy.

1a*) We recommend that the allocation of "unusual volumes" be made a responsibility of the Department of Energy. The Department can make these allocations based on need and the available disposal capacity and can do so objectively and from a national perspective.

1b) CAL RAD believes that all requirements placed on users of radioactive materials should pass a test of cost-effectiveness. Given the size of the very large surcharges proposed in S. 1578 and H.R. 1083, there is plenty of incentive for volume reduction of all wastes, and it is probably not necessary for the legislation to say anything further about reducing the "unusual" volumes.

2a) We recommend that users of radioactive materials be allowed to continue to ship their wastes to a disposal site of their choosing as is done now. If, as part of the process of compromise, it is necessary to have assignments made, then the Department of Energy should make the assignments.

---

* A copy of Senator Domenici's follow-up questions is attached.

[illegible] Nelson
GA Technologies Inc
Secretary

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Chief Financial Officer

Richard Riggin, M.D.
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Past Chairman

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INDUSTRIAL
Robert E. Butler
General Electric Co

Leon G. Culbert
Aerojet Ordnance Co

Harry R. Wellhauser
GA Technologies Inc

2b) CAL RAD believes that the legislation should include a non-discrimination clause. Wastes should be treated and regulated for what they are, not whose they are. We recommend that the Congress make clear, by means of a non-discrimination clause, that there will be no favored constituencies among the various sectors that use radioactive materials. An understanding that all users are in the same boat will contribute to the timely establishment of new disposal facilities. Non-discrimination should be the rule with respect to access, loss of access, and to generator/disposal site assignments.

3. How to put pressure on states and regions, rather than on the users of radioactive materials, to establish new facilities is the toughest issue facing the Congress. Withholding of federal funds (e.g., petroleum violation funds) from states that miss milestones or requirements that states that miss milestones be required to take title to wastes and assume all responsibility (including financial) for their storage and ultimate disposal are two mechanisms for putting pressure on the states. CAL RAD recommends against rebating surcharges to states which pass the milestones. This would simply be an incentive to the states to do only the minimum required to meet a milestone while delaying the process and using the full seven-year 1986-1992 transition period. In California, the facility developer will be a private entity under state regulation. The developer will pay the state an annual licensing fee of $250,000. It is not clear that any rebates which the state might receive would be needed to carry-out its regulatory function. We recommend that any rebates go to those who have paid the surcharges.

Among the mechanisms that the Congress may wish to consider are periodic reports on the details of progress toward new disposal facilities (or the lack of progress) by the General Accounting Office or by the DOE. Such reports may supplement other means as a form of "jawboning" and keeping attention focused on the state administrations and legislatures.

4) The relative impact of the proposed surcharges ($10, $20, $40) is very large. Applications to the California Department of Health Services from four private firms show that the cost of disposal pursuant to 10 CFR 61 in California will be as low as the low $20's per cubic foot. Costs for disposal with "encapsulation" will be as low as the low $30's per cubic foot. (The successful applicant will have to abide by its projections for the first two years of operation.) Therefore, the very high surcharges being proposed in the bills are much higher than necessary to encourage radioactive material users in California that it is to our advantage to have a new facility in operation in California as soon as possible.

5) CAL RAD will try to obtain cost estimates for volume reduction technologies. Suffice it to say that disposal costs are sufficiently high that many of our member organizations have invested in compaction equipment and are seriously considering incineration. At least two members have proposals for incinerators in the permitting process.

6) We don't have cost estimates for on-site interim storage, however, the capital costs are not much less that the capital costs for developing a disposal facility.

7) To encourage expeditious review of license applications by the NRC and the agreement states, the Congress could set time requirements for processing applications. The Congress may also want to consider discouraging the states from requiring exotic disposal techniques which depart from the requirements of 10 CFR 61 and cause regulatory delays for this reason. After all, the rulemaking for 10 CFR61 was completed only 3 years ago.

Sincerely,

Alan Pasternak

Alan Pasternak

cc: Marilyn Meigs, Consultant, Subcommittee
on Energy Research and Development
James McClintock, M.D.
Robert Kraft, M.D.
Jean Parker

Follow-up Questions for Mr. Alan Pasternak
CALRAD Forum

Hearing on Low-Level Waste
From Senator Pete V. Domenici

1. a) Regarding the allocation of "unusual volumes," would you have any objection to assigning this duty to DOE, who already has the expertise and data-gathering activities required to make informed, non-biased decisions?

   b) S. 1578 requires that all wastes being accepted under the "unusual volume" provision shall be reduced in volume "to the maximum extent technologically feasible." This seems to be awfully rigid, and does not take into account certain other criteria such as cost-effectiveness. Do you have any comments on this?

2. a) S. 1578 calls for the three sited states to make assignments of generator to disposal site. Do you think there might be a more appropriate mechanism by which to make such assignments? How?

   b) How would you propose to prevent discrimination against certain generators or certain types of wastes in making these generator/disposal-site decisions? What kinds of discrimination do you think are likely to occur?

3. As S. 1517 and S. 1578 now read, failure to meet certain milestones results in additional surcharges or denial of access. These penalties are imposed on the generator of such waste, where in fact the party at fault is the state or region that has failed to meet these established deadlines. Do you think these penalties, though indirect, will have the desired driving force on nonsited regions? Can you suggest a better, more appropriately directed penalty?

4. Compared to today's disposal costs, what is the relative impact of a $20/cu.ft surcharge? A $40/cu.ft surcharge?

5. What is the range of costs, in dollars per cubic foot, for some of the volume reduction technologies available today (i.e., mechanical compaction, incineration, etc.)?

6. What is the cost estimate, in dollars per cubic foot, for conventional on-site interim storage technologies?

7. How can we provide assurances that NRC reviews the license application in an expeditious manner?

FOLLOW-UP QUESTIONS FOR MR. J. J. Scoville

US Ecology

Hearing on Low-Level Waste

1. Who do you think is best qualified to make the assignment of waste generator to waste disposal site?

> US Ecology supports the provision for waste allocation by the three sited states during the transition period, as contained in H.R. 1083 as reported out of the House Interior and Insular Affairs Committee. Such a system would insure an equitable and fair market waste allocation within the confines of the market as determined by the compact legislation.
>
> US Ecology would also support a system which would insure that when the average annual volume level at one site reaches 100%, that site would accept no more waste until the other two sites reach their average annual volume level. Any average annual volume level surplus would be allocated in 10% increments to insure that each site maintains its proportional share of its average annual volume level as set forth in H.R. 1083 as reported out of the House Interior and Insular Affairs Committee. In addition, the company will support preferential treatment for in-region waste.

How Should we handle brokered wastes that originate from more than one compact region?

> Brokered wastes should be excluded from the prohibition on export and import found in the LLRW compacts. In some regions of the country it would be unprofitable for a broker to set up a warehouse if he were limited to in-region waste with the result that individual generators would have to ship their wastes independently. This would create unnecessarily small shipments of waste, and, thus, higher transportation costs.

2. Based on your experience, is the amount of disposal capacity reserved for non-utility generators adequate to meet the demand?

> A. We are of the opinion that with the volume reduction programs planned and in place today by both the utilities and the non-utility waste generators there should be sufficient capacity to accommodate the needs of the non-utility generators through December 31, 1992.

3. Why is so little waste shipped to the Beatty, Nevada site compared to the other two sites?

A. While various disincentives have been developed by the State of Nevada to discourage use of the Beatty facility, none is more powerful than the hostile regulatory atmosphere. The approach to regulation utilized by Nevada authorities discourages any economic considerations concerning disposal there. In fact, the Rocky Mountain Compact member states did not even utilize their Nevada site in 1984.

4. If a certain portion of the surcharge money were to be rebated to the compact commissions of nonsited regions, would your accounting system to able to clearly identify waste received on a region-by-region basis? Even brokered waste?

A. Using the existing data on file, especially as it relates to the cubic footage of waste received and buried, we could clearly identify waste received by generator and address on file. However, this would not be currently possible in the case of "brokered" waste since we are only required to maintain deliveries from brokers under the address of the broker. However, in recent discussions with the NRC, it may become necessary in the near future to record brokered shipments by the original generator, rather than by the broker as currently done. Should this occur, the company would be able to recover all waste receipt volumes by region and apply a surcharge amount of refund if approved.

Questions from the Minority

for Mr. J. J. Scoville, President, US Ecology

Low-Level Waste Policy

Joint Hearing of October 8, 1985

1. Joint EPA-NRC jurisdiction over Hazardous Waste.

Q. Describe the applicability of EPA and NRC regulatory authority to hazardous radioactive waste.

A. To the best of our knowledge the NRC has no direct statutory authority for the regulation of hazardous waste. This responsibility rests with the EPA under RCRA. However, the NRC and those agreement states that have entered into agreements with the NRC (South Carolina, Nevada, Washington) under Section 274 of the Atomic Energy Act of 1954 as amended are regulating radioactive wastes such as scintillation vials which contain minute quantities of toluene and xylene.

We see no reason why this regulatory procedure should not continue where the preponderance of the waste is radioactive and have so testified before your committee. This waste is strictly regulated under 10 CFR Part 61 of the NRC regulations which provides more than adequate health and safety protection for the public. To provide for the dual regulation of mixed wastes totalling approximately 2% of the radioactive wastes being disposed of in a low-level radioactive waste site makes little sense either from a regulatory or a taxpayer's point of view.

Q. What is proposed by the Administration to address this overlap?

A. During the question and answer period at the joint hearing held on October 8, 1985, before the Senate Subcommittee on Energy Research and Development of the Senate Energy and Natural Resources Committee and the Subcommittee on Nuclear Regulation of the Environment and Public Works Committee concerning Senate bills S.1517 and S.1578, Sheldon Myers, Acting Director of the Office of Radiation Programs, USEPA, testified that the EPA had no problem with the NRC regulating what is now known as "mixed waste." In view of our understanding as to the EPA practice of clearing its testimony with the Administration, we conclude that the Administration has no problem with the NRC continuing its present responsibility for the regulation of mixed waste. Indeed, both the NRC and the EPA support the resolution of the "mixed waste" issue as contained in H.R. 1083 as reported out of the House Interior and Insular Affairs Committee.

Q. Changes in statutory language.

A. As we pointed out in our testimony of October 8, there are a number of differences in the regulatory programs of both agencies but both are predicated on protecting the public health and safety. With some minor adjustments in the NRC regulations to alleviate the concerns of the EPA there is no question that the NRC has the staff and expertise to continue to assure that mixed wastes are disposed of in a safe manner. It is our belief that the mixed waste language contained in H.R. 1083 as reported by the House Committee on Interior and Insular Affairs will cure the mixed waste issue.

2. Responsibility of "Above Class C" Waste

(a) What is "above Class C" radioactive waste?

Greater than Class C waste is material that due to its high concentration of radionuclides with respect to their half-lives and radiotoxicities are generally not suitable for shallow land disposal. Greater than Class C wastes have to be evaluated on a case-by-case basis prior to acceptance for disposal.

(b) What volume of waste is involved? What activity?

Since restrictions on burial of this type of waste have existed for many years, it is difficult for US Ecology to determine the exact quantity of such waste which may actually exist. However, we do believe that the volume of Greater than Class C waste would be substantially less than the volume of Class C waste which US Ecology currently receives. Between January, 1983 and June, 1985, US Ecology had received only 18,270 cubic feet of Class C waste, representing only 0.5% of the total volume received for that period.

(c) Who currently has responsibility for above Class C radioactive waste that is not spent fuel or high-level radioactive waste? How does S.1578 treat this type of waste?

Currently, above Class C waste is referred to as "orphaned" waste since there are no federal or state agencies which allow for its disposal except for a case-by-case basis. Most commercial users of this type of material would be licensed by Nuclear Regulatory Commission or an Agreement State. Such licenses may not specify exact arrangements for disposal and may allow for storage of these materials for the term of the license.

S.1578 relates to "above Class C" wastes in the following areas:

i Definitions number 19 for "transuranic waste", (page 6, line 4) includes all transuranic isotopes which exceed Class C of 10 CFR 61.55. Such transuranic waste materials are specifically excluded from definition number 13 for "low-level radioactive waste" (page 4, line 23).

ii Section c(a) (page 6, line 11) entitled "State Responsibilities" requires that States become responsible for Class A, B, and C waste. "Above Class C" waste is not mentioned.

iii. Section 3(b) (page 7, line 16) entitled "Federal Responsibilities" requires that the Department of Energy determine what should be done with orphaned waste, including "above Class C" waste. A 12 month study period is specified.

(d) What are the principal options for dealing with this waste: Why shouldn't this waste be the responsibility of the Department of Energy for disposal?

Since the U.S. NRC has determined in its preamble to 10 CFR 61.55 that "Above Class C" waste is not suitable for shallow land burial, the options are limited. Since there are no guidelines on the disposal of this waste existing DOE facilities would not be suitable, since the DOE sites are also defined as low-level waste facilities. Also, the primary DOE low-level facilities potentially targeted for receipt of this waste are located in the three states of Nevada, Washington and South Carolina.

The only viable option is for the U.S. NRC or DOE to determine where these materials can be buried in an environmentally secure fashion. It is our recommendation that the disposal of "Above Class C" waste on a case-by-case basis be continued until such time as the DOE submits its report to the Congress in accordance with Section 3(b) of S.1578.

Question 3 from Senator Ford:

3. Disposal Capacity

(a) What is the physically available capacity at the existing commercial low-level waste disposal sites, by site? What is the volume of this capacity in relation to the volumes being produced now?

US Ecology's Washington facility has a remaining disposal space volume of approximately 40 million cubic feet, In 1984, there were 1,358,802.64 cubic feet of waste received in Washington. US Ecology's Nevada facility is accepting less than one per cent of the nation's low-level waste and has a remaining volume of approximately 13 million cubic feet of space. In 1984, there were 28,167.06 cubic feet of waste received in Nevada. It is estimated that the Barnwell facility has a remaining capacity of 10,000,000 cubic feet, with 1,231,653.98 cubic feet being received in 1984.

(b) How long could existing low-level waste sites accommodate low-level waste generated in the United States?

The nation's waste could be accommodated by the existing facilities until well past the year 2000.

(c) Are there any technical, safety or economic reasons why generators should adopt volume reduction technologies? What are they? What are the trade offs? Are there technical, safety or economic drawbacks to volume reduction? What are they?

Primarily as a cost-saving measure, many waste producers are already using compaction or other techniques such as waste segregation, better decontamination activities and short-term storage for decay to reduce volume. Although US Ecology cannot determine the exact volume of waste that has been treated in this manner by waste producers, we do know that the total volume of waste delivered to both of US Ecology's disposal facilities has remained essentially static over the past three years. This has occurred in spite of the fact that new nuclear power reactors and other industrial facilities have become operational during that time period.

Waste materials which have been treated by volume reduction may require additional and specialized site equipment to handle heavier loads. Potential higher exposure levels for site workers may be another consideration in handling waste which has been reduced in volume. This increased radiation hazard may also require the use of remote handling facilities. The pricing structure would also need to be adjusted to reflect the changes in site operations that would occur in handling smaller volumes with higher radiation levels.

4. Costs

(a) What is the actual costs (including transportation) on a per cubic foot basis of low-level waste disposal under current NRC regulations?

The current basis per cubic foot charge for disposal at US Ecology's facilities is $17.85 in Nevada and $22.14 at the Washington facility. This basic charge is subject to surcharges due to high radiation, high activity, the use of shielded returnable casks and other less significant factors. For this reason, the actual average per cubic foot charge will be higher than the basic charge.

Charges for transportation will vary dramatically depending upon the point of origin of the waste and upon the type of waste. Transportation charges are about $6.00 per cubic foot for low exposure waste originating in the eastern U.S. destined for a western disposal facility. If the same waste had a high exposure level which would require a shielded cask, the transportation charges could approach $100.00 per cubic foot.

(b) What non-cost charges are currently applied to low-level waste disposal by each of the States with existing sites? What is the relation of these costs to the surcharges proposed under S.1578?

Currently, the basic per cubic foot charge at the Washington site is broken down as follows:

Basic Washington Gate Price (effective 8/1/85) - $22.14 per cubic foot.

Site surveillance fee (3% of basic gate price) - 0.66 per cubic foot.

Fees Perpetual care and maintenance - $1.75 per cubic foot.

Site closure fund - 0.25 per cubic foot

Total charge less WA state fees - $19.48 per cubic foot.

Tax Unadjusted gross revenue tax (Business & Occupations (BO) (33% of revenue less fees) - $6.43 per cubic foot. The Washington State Department of Ecology is presently proposing an additional 30% (BO) tax on commercial low-level radioactive waste disposal operations to fund a Washington State Superfund program.

Total retained by US Ecology - $13.05 per cubic foot

The basic charge at Nevada is $17.85 per cubic foot. Of this, $0.25 per cubic foot is collected by the State of Nevada for the purpose of perpetual care and maintenance. The remainder, $17.60, is retained by US Ecology. All burial fees which are paid to Washington and Nevada are retained for the specific purpose for which they are collected. However, the gross revenue tax in Washington becomes a part of the general revenue of the state, and the surveillance fee funds an entire statewide radiation monitoring program in addition to covering the cost of disposal site surveillance.

Both states also collect annual user permit fees from waste generators. The State of Nevada also requires that each waste producer comply with the requirements of the Nevada Inspection Service (NIS) which is an independent testing service selected by the state. Basically, NIS will inspect the waste producer's facilities prior to the first shipment. The fee for this inspection is approximately $2000. Additional fees are also levied by NIS on a per cubic foot of waste basis, as described below:

Annual Volume-To-Date	NIS Fee Per Cubic Foot
1 - 5000 cu.ft.	$3.50
5001 - 10000 cu.ft.	$3.00
10001 - 15000 cu.ft.	$2.00
15001 - 25000 cu.ft.	$1.00
more than 25000 cu.ft.	No additional charge

The surcharges proposed by S.1578 would be in addition to the existing taxes and fees.

Q. Low-Level Waste Definition.

Please provide the Committee with a suitable legal definition of low-level waste for the purposes of the amendments to the Low-Level Waste Policy Act under consideration in the Committee.

A. While we have publicly stated in the past our preference for the definition found in the Nuclear Waste Policy Act of 1982, we would want to be certain that the definition is broad enough to cover naturally occurring and accelerator produced radioactive waste (NARM), It is our view that by amending the definition in the 1982 Act referenced above so that it would read "the term 'low-level radioactive waste' means any radioactive material whether or not it is subject to the provisions of the Atomic Energy Act of 1954, as amended, that is not etc." would cure the problem presented by the NARM waste.

Texas Low-Level Radioactive Waste Disposal Authority

Lawrence R. Jacobi, Jr
General Manager

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Suite 175
Austin, Texas 78752
(512) 835-6795

Members of the Board

John E. Simek, Chairman
William L. Fisher, Ph.D., Vice Chairman
Elbert B. Wharton, Ph.D., Secretary
Robert L. Clement, M.D., F.A.C.S.
James F. Allison
Jim E. Phillips

October 24, 1985

The Honorable Pete V. Domenici
Chairman, Subcommittee on
  Energy Research & Development
Senate Committee on Energy
  & Natural Resources
Washington, D.C. 20510

Dear Senator Domenici:

Thank you for your letter of October 16, 1985. I appreciated the opportunity to appear before your Subcommittee and present testimony concerning the proposed amendments to the Low-Level Radioactive Waste Policy Act of 1980.

The enclosed information is provided as you requested. Please contact me if you need further information at our new offices (effective October 26, 1985) at 7703 North Lamar, Suite 300, Austin, Texas 78752, or at 512/451-5295.

Sincerely,

Tom Blackburn

Thomas W. Blackburn III
Director, Special Programs

TWB:mn

Enclosure

1. The U.S. Nuclear Regulatory Commission should monitor state and compact adherence to milestones. Through the authorization of Congress, the sited states should enforce the penalties associated with missed milestones.

2. This question is not pertinent to Texas and would best be answered by those states belonging to compacts.

3. The cooperation between Texas and the U.S. Department of Energy in the development of a low-level radioactive waste disposal facility for Texas will assist Texas in the timely completion of a disposal facility. The lessons learned from this joint effort will be beneficial to other states and regions in their efforts.

4. Texas fully supports the concept of rebating a percentage of the surcharge funds back to states or compact commissions. The funds should be directed to either the applicable regional compact commission or to the appropriate state agency in the case of the single state approach. The rebated funds should be specifically earmarked for the development of low-level radioactive waste disposal facilities.

5. The enabling legislation of the Texas Low-Level Radioactive Waste Disposal Authority authorizes the Authority to administer impact assistance grants to any city, county, hospital district, school district, water district, or other political subdivision of the state to reimburse that entity for actual costs or to pay expenses anticipated in connection with additional fire, police, educational, utility, public access, and other governmental services, public works projects, and planning that are required as a result of the construction and operation of a disposal site.

6. The surcharge plans currently under discussion are the most effective methods for providing incentives for unsited states and regions to develop new disposal facilities. By targeting generators with surcharges and volume restrictions, their input to the political process will speed the process along.

7. The concept of exempting wastes having a half-life of less than 100 days from low-level waste burial requirements would allow for these materials, although still considered radioactive, to be disposed of by methods other than those currently prescribed in 10 CFR Part 20. The recommendation that the U.S. Environmental Protection Agency define de minimis levels of radioactive materials would call for the EPA to set standards below which materials no longer considered radioactive could be disposed of without regard to their radioactive properties.

8. See item 3 above.

9. See item 5 above.

State of Maine
Senate Chamber
Augusta, Maine 04333

October 29, 1985

To: Senator Pete V. Domenci
From: State Senator Judy C. Kany

Subj: Answers to your additional questions

1. Monitoring milestones: The host state in the first instance has the right to monitor, but there needs to be a more detached, impartial avenue of appeal.

- perhaps USNRC?
- Federal District Court?

2. Severability & re-ratification: I am not aware of any problem, but we do not have a compact before Congress.

3. Technical assistance from DOE: What would help the most is full NRC rulemaking on engineered facilities, since conventional shallow land burial will not be acceptable in Maine. DoE research & technical assistance could also help speed up siting.

4. Rebating surcharge funds to the states through DOE would provide an additional control point and might give more control over how the funds are used. However, the State probably know better than DOE what should be done with it.

5. We have not yet addressed local incentives, although we do include local representation in review of environmental permits.

HW/elk/3908

Follow-up Questions for State Senator Judy Kany
Chairman, Advisory Panel on Radioactive Waste, Waterville, Maine

Hearing on Low-Level Waste
From Senator Pete V. Domenici

1. How do you envision monitoring the adherence to milestones? Who should administer and enforce such work?

2. Each of the compacts now before Congress contains a "severability clause" that allows any provision of the compact to be severed if it is contrary to the Constitution or some federal or state law, without invalidating the remainder of the compact provisins. With that clause in mind, and considering the provisions of S. 1578 that preserve the Federal government's jurisdictions, do you foresee of any circumstance under which these compacts would have to be sent back to the states for re-ratification?

3. Would further technical assistance from DOE significantly reduce the time required to develop a disposal site in your state?

4. Do you think that rebating surcharge funds back to states through DOE grants and assistance, rather than directly back to the states, would provide a greater assurance that the money would be applied where it is needed the most?

5. What kinds of local incentives does your region plan on using to gain greater public acceptance of a low-level waste facility in that particular community?

William W. Berry
Chairman and
Chief Executive Officer

Post Office Box 26666
Richmond, Virginia 23261
804-771-3193

VIRGINIA POWER

October 28, 1985

Senator Pete V. Domenici
Chairman, Subcommittee on Energy
and Research and Development
United States Senate
Washington, D. C. 20510

Dear Senator Domenici:

In response to your letter of October 16, enclosed are the responses to you and your colleagues' questions. I appreciate the opportunity to provide you with the position of the electric utility industry on this important issue.

If I can assist you in any other way, please let me know.

Sincerely,

William W. Berry

William W. Berry
Chairman, Virginia Power
and
Chairman, EEI Task Force on
Low-Level Radioactive Waste Disposal

Enclosures

Responses to Senator Domenici's Questions on Low-Level Waste Legislation

From Mr. William W. Berry,
Chairman, Virginia Power
and EEI, ANEC, and UNWMG

Question 1.a:

Regarding the allocation of "unusual volumes," would you have any objection to assigning this duty to DOE, who already has the expertise and data-gathering activities required to make informed, non-biased decisions?

Answer:

It is important that the unusual volume be allocated by an informed, unbiased organization with expertise and data gathering activities related to the utility industry. It is also important that these allocations be quickly and fairly distributed when needed, since this volume is an integral portion of the total utility allocation. With these criteria in mind, we do not object to assigning this allocation duty to DOE.

Question 1.b:

S. 1578 requires that all wastes being accepted under the "unusual volume" provision shall be reduced in volume "to the maximum extent technologically feasible." This seems to be awfully rigid, and does not take into account certain other criteria such as cost-effectiveness. Do you have any comments on this?

Answer:

Requiring waste to be reduced in volume "to the maximum extent technologically feasible" is totally unwarranted. First, the term "maximum extent technologically feasible" is undefined, and its meaning is open to considerable debate. Second, as technology advances the standard would advance, so that a multi-million dollar capital expenditure for state of the art volume reduction equipment could become outdated very quickly. Third, state of the art technology is inevitably subject to problems as it is implemented, and utilities would be required to trade in one technology (and its problems) for another, perhaps before completely de-bugging the first. Fourth, the standard makes no reference to the cost-effectiveness of volume reduction, nor any correlation with the perceived "benefits" of volume reduction. Finally, and most importantly, the unusual volume allocation is an integral portion of the total utility industry share of the waste limits. It should be left to the discretion of the industry how to best comply with these limits. Utilities must already achieve substantial volume reductions to stay within their allocated volumes. To require additional reductions on waste produced under unusual circumstances is neither warranted nor appropriate.

Question 2.a:

S. 1578 calls for the three sited states to make assignments of generator to disposal site. Do you think there might be a more appropriate mechanism by which to make such assignments? How?

Answer:

The disposal of low-level waste currently is accomplished without assigning generators to disposal sites.

Volumes are distributed among the three sites by the free-market, subject to an annual cap at one site. S. 1578 replaces the annual cap with a four year cap, followed by a three year cap. Within these limits it should be possible to allocate disposal by any of several methods, including either the free market or assignment of generators to sites.

Question 2.b:

How would you propose to prevent discrimination against certain generators or certain types of wastes in making these generator/disposal-site decisions? What kinds of discrimination do you think are likely to occur?

Answer:

If a three state agreement approach is used to assign generators to sites, it is important that such assignments be done equitably, in a non-discriminatory manner. Statutory language should provide that assignments consider the desirability of minimizing disposal costs, including transportation costs and surcharges. In addition, such assignments should not discriminate based upon either the source or class of the waste.

Question 3:

As S. 1517 and S. 1578 now read, failure to meet certain milestones results in additional surcharges or denial of access. These penalties are imposed on the generator of such waste, where in fact the party at fault is the state or region that has failed to meet these established deadlines. Do you think these penalties, though indirect, will have the desired driving force on nonsited regions? Can you suggest a better, more appropriately directly penalty?

Answer:

The penalties in S. 1517 and S. 1578 are not perfect. It might be more effective to have the penalties apply directly to the states or regions who are responsible for meeting the deadlines. These penalties might include loss of federal funds, for example. In this instance, however, the perfect (penalties applied to states) may be the enemy of the good (obtaining compromise legislation this year). We do feel strongly that if penalties such as surcharges and loss of access are applied to waste generators, they should apply to all waste generators.

Question 4:

Compared to today's disposal costs, what is the relative impact of a $20/cu.ft surcharge? A $40/cu.ft surcharge?

Answer:

Current disposal costs (not including transportation) for waste generated by electric utilities range from $20-50 per cubic foot, based on the activity of the waste. The average charge for disposal is approximately $25-30 per cubic foot. Thus a $20 per cubic foot surcharge almost doubles our disposal cost, and a $40 charge almost triples it.

Question 5:

What is the range of costs, in dollars per cubic foot, for some of the volume reduction technologies available today (i.e., mechanical compaction, incineration, etc.)?

Answer:

All utilities today conduct extensive volume reduction efforts. For example, virtually all utilities use some or most of the following volume reduction techniques: waste-compaction, decontamination, filtration, waste sorting, and minimization of initial waste generation. The cost of these efforts ranges from approximately $1-10 per cubic foot.

Additional efforts, such as supercompaction and incineration are much more expensive ($20-80 per cubic foot), pose potential licensing problems, and are not as often used.

It is important to note that these "second generation" volume reduction technologies merely reduce the "size of the package". The total amount of radioactivity in the package is unchanged. In addition, worker exposure is increased through increased handling, and public health and safety is not increased.

A more effective means of reducing volumes of waste requiring disposal would be the development of a "de minimis" standard for waste that is below regulatory concern. Such a standard, as provided for in Section 12 of S. 1578, would immediately reduce the volume of waste requiring disposal by 10-30%, with no significant risk to the public health and safety, and a reduction in disposal costs.

Question 6:

What is the cost estimate, in dollars per cubic foot, for conventional on-site interim storage technologies?

Answer:

Conventional on-site storage is of course not a solution to the question of disposal -- it merely delays final disposal. Storage also increases waste processing, increases waste handling and worker exposure, and does not benefit public health or safety. Significant storage of waste might also unfortunately temporarily relieve existing political pressure to develop new disposal sites.

On-site storage is also an expensive proposition. Depending upon the type of waste, containers, and building design chosen, storage can cost from $15-250 per cubic foot of waste. A typical range of costs for utilities is $40-50. (These costs are in addition to the final disposal costs.)

Question 7:

How can we produce assurances that NRC reviews the license application in an expeditious manner?

Answer:

First, NRC ought to develop procedures, prior to 1990, for processing license applications. (Language to require this is included in Section 14 of H.R. 1083 as reported by the House Interior and Insular Affairs Committee, for example.) NRC has testified that it will require fifteen months for its technical review of an application, to be followed by public hearings. We feel that such limits should be contained in any legislation enacted. (This language is also included in both the House Interior Committee version and the House Energy Conservation and Power Subcommittee version of H.R. 1083.)

Responses to Senator Ford's Questions
By William W. Berry, Chairman, Virginia Power
and EEI, ANEC, and UNWMG

Question 1: Joint EPA-NRC Jurisdiction Over Hazardous Radioactive Waste

Describe the applicability of EPA and NRC regulatory authority to hazardous radioactive waste. What is proposed by the Administration to address this overlap? What would you propose to resolve any difficulties? What other options are there? Please be specific as to any changes in statutory language you recommend.

Answer:

Since EPA regulates hazardous waste and NRC regulates radioactive waste, waste which is both hazardous and radioactive could be subject to regulation by both. The two agencies have taken very different approaches in their regulation. For example, RCRA regulations encourage both waste verification analyses and leachate collection systems, but NRC disposal regulations discourage both. Thus it may be impossible to meet both sets of regulations.

Section 15 of H.R. 1083 (as reported by the House Interior and Insular Affairs Committee) establishes a means of addressing this problem by requiring that: a) EPA (with the concurrence of NRC) identify any such mixed waste; b) EPA (again with NRC concurrence) promulgate disposal regulations; and c) EPA delegate authority to NRC to permit such disposal.

We support this proposal for the regulation of mixed waste. To our knowledge, NRC, EPA, and the disposal site operators also support it.

Question 2: Responsibility of "Above Class C" Waste

What is "above class C" radioactive waste?

What volume of waste is involved? What activity?

Who currently has responsibility for above class C radioactive waste that is not spent fuel or high-level radioactive waste? How does S. 1578 treat this type of waste?

What are the principal options for dealing with this waste? Why shouldn't this waste be the responsibility of the Department of Energy for disposal?

Answer:

Low-level waste is defined as that radioactive waste which is not high-level waste, transuranic waste, spent fuel, or byproduct material as defined in Section 11(e)2 of the Atomic Energy Act of 1954. This definition is used consistently in the Low-Level Radioactive Waste Policy Act of 1980, the Nuclear Waste Policy Act of 1982, and the NRC regulations regarding Land Disposal of Radioactive Waste (10 CFR 61). The NRC regulations also set forth a classification scheme by which all low-level waste can be determined to be class A, class B, class C, or greater than class C.

Greater than class C waste is low-level waste with higher activity than class C waste. Examples might include instrumentation or hardware from a reactor which has become irradiated. The volume of greater than class C waste is less than 1% of all low-level waste.

Since greater than class C waste is defined as low-level waste, the states currently have responsibility for disposal of this waste. S. 1578, on the other hand, declares that the states have responsibility only for disposal of classes A, B, and C waste, as currently defined. Responsibility for greater than class C waste or other waste which may be in the future defined as low-level waste is not determined.

In order to be consistent with the Nuclear Waste Policy Act, to conform to the intent of the 1980 Low-level Radioactive Waste Policy Act, and to avoid creating a new class of orphan waste, we feel that all low-level waste, as properly defined, should continue to be a state responsibility.

Question 3: Disposal Capacity

What is the physically available capacity at the existing commercial low-level waste disposal sites, by site? What is the magnitude of this available capacity in relation to the volumes being produced now?

How long could existing low-level waste sites accommodate low-level waste generated in the United States?

Are there any technical, safety, or economic reasons why generators should adopt volume reduction technologies? What are they? What are the trade offs? Are there technical, safety, or economic drawbacks to volume reduction? What are they?

Answer:

In regard to disposal site capacity, according to Mr. J. J. Scoville, President of U.S. Ecology, Inc. "... the nation's three present low-level radioactive waste sites can accommodate all of the nation's commercial low-level radioactive waste well past the year 2000. Existing disposal capacity at the three sites is estimated as follows: 10 million cu. ft. at the Barnwell, South Carolina site; 13 million at the Beatty, Nevada site; and over 40 million at the Hanford, Washington site. Our projections indicate that there will only be a need for some 50 million cu. ft of disposal space through the year 2000."

In regard to volume reduction, all utilities today conduct extensive volume reduction efforts. For example, virtually all utilities use some or most of the following volume reduction techniques: waste compaction, decontamination, filtration, waste sorting, minimization of initial waste generation, and numerous procedures and policies. The cost of these efforts is approximately $1-10 per cubic foot.

Additional efforts, such as supercompaction and incineration are much more expensive ($20-80 per cubic foot) and are not as often used.

It is important to note that these "second generation" volume reduction technologies merely reduce the "size of the package". The total amount of radioactivity in the package is unchanged. In addition, worker exposure is increased through increased handling, and public health and safety is not increased.

A more effective means of reducing volumes of waste requiring disposal would be the development of a "de minimis" standard for waste that is below regulatory concern. Such a standard, as provided for in Section 12 of S. 1578, would immediately reduce the volume of waste requiring disposal by 10-30%, with no significant risk to the public health and safety, and a decrease in disposal costs.

Question 4: Costs

What is the actual cost (including transportation) on a per cubic foot basis of low-level waste disposal under current NRC regulations. What non-cost charges are currently applied to low-level waste disposal by each of the States with existing sites? What is the relation of these costs to the surcharges proposed under S. 1578? How much does each sited State take in from low-level waste charges? What do these States do with the revenue they generate from low-level waste charges?

Answer:

Electric utilities pay from $25 to $80 per cubic foot for low-level waste disposal, including transportation and surcharges. In addition to the cost of disposal, the existing sites collect taxes, surcharges, and curie charges. (We feel that questions relating to the amount of revenue generated by these surcharges and the uses for this revenue could be best answered by the states themselves.)

Question 5: Low-Level Waste Definition

Please provide the Committee with a suitable legal definition of low-level waste for the purposes of the amendments to the Low-Level Waste Policy Act under consideration in the Committee.

Answer:

As noted above, we feel that the definition of low-level waste for use in these amendments (both as a definition and as a state responsibility) should be equivalent to that used in the original 1980 Act and 1982 High-Level Waste Act.

That is, the term 'low-level radioactive waste' means radioactive material that --

(A) is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or byproduct material as defined in section 11 e.(2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(e)(2): and

(B) the Nuclear Regulatory Commission, consistent with existing law, classifies as low-level radioactive waste.

Midwest Interstate Low-Level Radioactive Waste Commission
Room 588 • 350 N. Robert Street • St. Paul, MN 55101 • (612) 293-0126

October 28, 1985

Honorable Pete V. Domenici
U. S. Senate
Washington, D. C. 20510

Dear Senator Domenici:

I am writing in response to the five questions on Senate Bills S. 1517 and S. 1578 you posed in your October 16, 1985 letter. Due to the time limitation on your request, my comments have not been formally adopted by the Midwest Compact. I have added your questions and my response to our November 13, 1985 Commission meeting agenda for discussion and adoption.

Although my comments have not been officially adopted by the Midwest Compact, I have discussed the matter with Commission members and believe that I have provided you with a fair representation of past policy positions.

As your Subcommittee continues to debate the complex issue of low-level radioactive waste, the Midwest Compact welcomes the opportunity to work with you in developing a sound and equitable solution to the Nation's low-level waste problem.

Sincerely,

Richard Paton

Richard Paton
Executive Director

FOLLOW-UP QUESTIONS
TO THE OCTOBER 8, 1985 SENATE JOINT SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT AND SUBCOMMITTEE ON NUCLEAR REGULATION HEARING ON LOW-LEVEL RADIOACTIVE WASTE

Question 1. How do you envision monitoring the adherence to milestones? Who should administer and enforce such work?

Answer 1: The monitoring of compliance with milestones outlined in S. 1517 and S. 1578 should rely upon a process which is relatively simple, easy to implement, requires minimal administration and can be fully developed in a timely fashion. The monitoring system should avoid placing major administrative, monitoring or regulatory burdens on states and/or compact commissions. Imposing such requirements on states and compacts will only further detract from the ability to concentrate on siting new disposal facilities. For the next seven years the primary focus of commissions and states should be on siting and developing new regional facilities. Finally, it should be noted that compact commissions and individual states have limited powers and authorities with respect to enforcing provisions of milestone achievement such as any requirements for volume reduction or, if needed, on-site waste storage.

Given these constraints, a milestone monitoring and enforcement system could be developed which builds upon the present information recording system of the Department of Energy, the Nuclear Regulatory Commission and the existing site operators. These record systems could be integrated to form a computerized "national" low-level waste records system. All transactions at disposal sites would be recorded to indicate the volume and type of wastes disposed of by waste generators. Additional records on surcharges, penalties and progress of non-sited regions/states would also become a part of the national system.

If program milestones are missed and emergency access is denied, some consideration must be given to how states and compacts may enforce internal interim requirements to minimize public health and safety risks.

Question 2. Each of the compacts now before Congress contains a "severability clause" that allows any provision of the compact to be severed if it is contrary to the Constitution or some federal or state law, without invalidating the remainder of the compact provisions. With that clause in mind, and considering the provisions of S. 1578 that preserve the Federal government's jurisdictions, do you foresee of any circumstance under which these compacts would have to be sent back to the states for re-ratification?

Answer 2. When individual states adopted the interstate compact agreement, they did so based upon the conditions, policies and requirements outlined in the compact language and the Low-Level Radioactive Waste Policy Act of 1980. Several states were hesitant to join compacts without taking precautions to protect state interests should Congress modify or change the compacts during the congressional consent process.

Several of the Midwest Compact states enacted compact companion legislation which states..."In the event that congressional consent to the compact carries with it conditions that materially change the provisions agreed to by the party

If the underlying principles or major compact provisions, responsibilities or requirements are materially altered by Congress, some states may require the re-submittal of the compacts for state ratification.

Every effort should be made to preserve the compact language and all of the underlying principles upon which the compacts were formed.

Question 3. Would further technical assistance from DOE significantly reduce the time required to develop a disposal site in your state?

Answer 3. Technical assistance from the U. S. Department of Energy would be helpful but it is questionable as to whether such assistance would "significantly reduce" the time needed to site new regional facilities. The timetable established in S. 1517 and S. 1578 was established after a close review of the logical and sequential steps necessary to identify, license and construct new disposal facilities.

Any effort to reduce the time provided regions and states for site identification will be viewed as efforts to emphasize program expediency above the development of a technically defensible plan of action with proper opportunities for public involvement. Such action would only serve to destroy the region's credibility. Strong assurances that proper review and technical accuracy is achieved are needed to effectively demonstrate that public health and safety are preserved.

The DOE could provide a valuable service in developing generic support studies of alternative technologies, environmental impacts and health and safety implications of low-level waste disposal and management. Of greater service, however, would be much needed financial assistance to states and regions during the selection and characterization phases of site development.

Question 4. Do you think that rebating surcharge funds back to states through DOE grants and assistance, rather than directly back to the states, would provide a greater assurance that the money would be applied where it is needed the most?

Answer 4. The surcharges outlined in S. 1517 and S. 1578 have the potential of generating over 250 million dollars in revenue. These surcharges are in addition to disposal charges, state and local taxes and long term care fund payments that are required of each site user. Under the provisions of the proposed act amendments, the surcharge revenues go directly to the three states with operating sites. While compensation for interim use of existing facilities may be justified, such compensation must be reasonable.

If the surchages remain at the levels outlined in S. 1517 and S. 1578 some mechanism is needed to insure that the revenues collected are directed to uses which will further the development of new disposal sites. Toward this end, three options appear to exist: 1). rebates could be returned to the individual states; 2). rebates could go to a national fund; or 3). rebates could go to the compacts and go-it-alone host states.

The use of a mechanism by which rebates are sent to individual states poses several problems. First, rebated funds would still have to be allocated by state legislatures. The siting new disposal facilities will be difficult. If a state agency must continulally seek allocations to carry out its responsibilities for site development, the siting activities could become a more political issue than is necessary. If a state is going to be successful in its siting efforts it should not have to worry about the legislature imposing special restrictions on the allocation of site development funds. Second, for many states the rebates back to the state would be viewed as a "laundered" tax. This would conflict with other state efforts to minimize new taxes. Finally, the amount of rebates returned to a state will vary significantly. There is no assurance that a small generating state will not be selected as a host state. If this should occur there will not be sufficient revenues to successfully support a site development program. Having money transfered from one state treasury to another may not be practical.

Rebates to a national fund also presents several problems. First, the money would likely be administered by the Dept. of Energy (DOE). The DOE has not demonstrated its ability to manage radioactive waste programs effectively. Second, three of the Midwest states are candidates for a high level repository. Grants from the DOE for site development would futher confuse and complicate the distinction between high level and low level waste problems in our region. Third, federal grant programs often have high federal agency administration costs. With limited funds an approach which minimizes administrative overhead is needed. Fourth, DOE has not demonstrated its ability to provide grants in a timely manner or for purposes that regionally or locally are determined in the best interest of the region. Unless Congress can impose a strict time limit for passing grants on to the states and regions, limit the federal administration cost to under 1% of the rebates, limit the constraints placed on the regions for use of the grants and insure that the vast majority of the rebates are returned to the states/regions and not used by the DOE for generic studies, a federal fund is not advised.

The Midwest Compact Commission recommends that the rebates be returned to the Compact Commissions for administration. The Commissions are responsible for the development of regional waste management/disposal plans. Such plans may require the development of more than one regional facility. The Commissions may also be required to develop local and state incentive programs. As such the Commissions are in the best position to allocate the necessary funds equitably and in the most efficient manner.

Of equal importance to establishing a proper mechanism for the allocation of rebates is the need to insure that a sufficient share of the surcharges are returned for new site development. Several sources such as DOE/LLW-25T (Economic Model for LLW Disposal Sites 1983) and site operators indicate that the initial cost of siting and developing a regional disposal facility is about 25 million dollars.

In the past most of this development money was provided by the site developer. In a meeting with several site operators the Commission was told that because of the volume limits imposed by the compacting process and due to the uncertainties associated with the newly formed compacts, private companies are less likely to spend the initial development costs as they did in the past. There is going to be a need for the compacts and/or states to share in the initial development costs. Further, regions and states will need financial resources to undertake independent site characterization and site screening. These two elements alone could cost 5-8 million dollars. Finally local and state incentive programs may be needed. A conservative estimate of compact costs associated with new site development is 10-16 million dollars. For these reasons a rebate of at least 25-50% of all surcharges collected should be returned to the compact regions.

Question 5. What kinds of local incentives does your region plan on using?

Answer 5 As part of its management planning efforts, the Midwest Compact is exploring ways in which local incentives and compensation tools could be used to financially assist localities where low-level radioactive waste facilities may be developed. A draft incentives report that outlines types of incentives and describes how such incentives might be utilized has been prepared. A more detailed incentive package is being developed as part of the management plan. It is clear that if an incentive package is going to succeed, sufficient financial resources will be needed.

STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY
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TERRY R LASH
DIRECTOR

October 30, 1985

The Honorable Pete V. Domenici
U.S. Senator
Chairman, Subcommittee on Energy
Research and Development
4239 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator Domenici:

Attached to this letter are answers to questions which were posed as a follow-up to my testimony on October 8 before the Subcommittee on Energy Research and Development of the Energy and Natural Resources Committee and the Subcommittee on Nuclear Regulation of the Environment and Public Works Committee regarding S. 1517 and S. 1578.

The opportunity to answer the questions is appreciated, and I sincerely hope these comments will guide the Subcommittees in their action on this important issue.

Sincerely,

Terry R. Lash
Director

TRL:sp
Enc.

ANSWERS TO QUESTIONS TO DR. TERRY R. LASH FROM SENATOR PETE V. DOMENICI, CHAIRMAN, SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT

QUESTION 1:

How do you envision monitoring the adherence to milestones? Who should administer and enforce such work?

ANSWER:

Responsibility for monitoring adherence to milestones will vary depending on the milestone in question. Each individual state is responsible for adhering to the first milestone (compact ratification or enactment of siting legislation). The second milestone (selection of a host state and development of a siting plan) should be the responsibility of both the regional compact commissions and host states, or individual states where the state is not a member of a compact. With respect to the third milestone (submission of a license application) as in Illinois, most states prefer a private sector approach where a private company will submit the application. In compact regions responsibility for adherence to this milestone should rest with both the regional compact commission and the host state. States not members of compacts would be responsible for their own adherence to this milestone. In all cases, once a milestone has been met, a written certification should be submitted to the three existing host states by the chairman of the compact commission and/or governor of the state depending on which entity is responsible for meeting the milestone.

The Central Midwest Compact Region has essentially already met the first two milestones and expects to meet the third. The Compact has been adopted by both Illinois and Kentucky and the host state will be Illinois. With regard to the third milestone, Illinois, as the host state, will be administering and enforcing the work needed to meet this milestone through the efforts of the Illinois Department of Nuclear Safety. The Governor of Illinois will certify compliance with the milestone in letters to the Governors of South Carolina, Nevada and Washington.

QUESTION 2:

Each of the compacts now before Congress contains a "severability clause" that allows any provision of the compact to be severed if it is contrary to the Constitution or some federal or state law, without invalidating the remainder of the compact provisions. With that clause in mind, and considering the provisions of S. 1578 that preserve the Federal government's jurisdictions, do you foresee of any circumstance under which these compacts would have to be sent back to the states for re-ratification?

ANSWER:

It is not clear that re-ratification can be avoided simply because of severability clauses in compacts and preservation of the Federal government's jurisdictions in S. 1578. The need to resubmit compacts to state legislatures is an extremely complex legal and political question. The process by which compacts were passed initially by state legislatures was lengthy and difficult. Similar difficulties can be expected if it becomes necessary to obtain legislative approval of modified versions of compacts. There is a significant risk that such efforts would not succeed. Thus, Congress should avoid any actions which could be interpreted as requiring re-ratification by states.

QUESTION 3:

Would further technical assistance from DOE significantly reduce the time required to develop a disposal site in your state?

ANSWER:

Yes. During the transition period between now and when new regional facilities are in operation, it is critical that additional money and expertise be made available to states and compact regions. When the Low-Level Radioactive Waste Policy Act of 1980 was enacted, states literally had to start from scratch in carrying out their responsibilities. Few states had staff knowledgeable on low-level waste issues, and limited resources were available. In addition, states and regions had to begin these tasks simultaneously which meant, for example, competing with one another for the limited expertise that was available.

Technical assistance would be valuable to Illinois given the expertise available from DOE. Direct financial support from DOE to fund specific research necessary to site a disposal facility in Illinois also would be of great benefit in terms of time savings. While some siting issues are common to all states and regions, certain issues that Illinois will face are specific to Illinois. Additional funding to conduct such studies would help assure compliance with the milestones in the proposed amendments to the 1980 Low-Level Radioactive Waste Policy Act.

QUESTION 4:

Do you think that rebating surcharge funds back to states through DOE grants and assistance, rather than directly back to the states, would provide a greater assurance that the money would be applied where it is needed the most?

ANSWER:

No. I advocate rebating surcharges to those states in which regional low-level waste facilities will be located, with a requirement that funds be used exclusively for the siting, development and operation of new facilities. Rebating the money through DOE could result in delays due to the process of applying and receiving grants. Moreover, DOE does not always fully understand the needs of states in this controversial area. As a consequence, rebate monies might not be applied to the critical needs of states.

QUESTION 5:

What kinds of local incentives does your region plan on using to gain greater public acceptance of a low-level waste facility in that particular community?

ANSWER:

The issues of public acceptance and local incentives are really quite separate. The Illinois Department of Nuclear Safety is committed to a siting process which includes an extensive public participation program. There are several stages of effort that must be made to obtain public acceptance of a low-level waste facility. Currently in Illinois we are focusing on major state-wide organizations. The Illinois Department of Nuclear Safety is about to publish a "Plan for Public Participation on Low-Level Radioactive Waste Management Issues In Illinois". A Citizens Advisory Group has been formed which includes local representatives but consists mostly of members from state-wide groups (environmentalists, generators, and other interested groups.)

In the next several months we will be increasing our efforts to involve local communities. For example, this winter a meeting is scheduled at which national experts will address local officials on the issue of locally unwanted land uses (LULU's).

Because shallow land burial is prohibited in the Central Midwest Region, the decision on where to site a low-level waste facility becomes less important than the design and operation of the facility. There is less need to rely on hydrogeologic considerations and more need to emphasize the engineering of the structure itself. Thus, a key element to dealing with local interests will be the ability to assure local participation in monitoring and enforcing safety standards at regional facilities. We also must be able to assure local officials that facilities that fail to meet these standards would not be allowed to operate.

QUESTION 6:

The Central Midwest Compact prohibits the shallow-land burial of waste. How does this Compact region figure that an alternative disposal method would be developed in time to meet the deadline, considering that we neither have the alternative method defined, nor the licensing criteria identified by the NRC?

ANSWER:

Alternatives to shallow land burial are already in use in Europe. In addition, several American companies have come forward with designs for alternative technologies which they are prepared to build and operate.

In the Central Midwest Region the Illinois Department of Nuclear Safety (IDNS) has begun the process of evaluating alternative disposal technologies. IDNS is participating in a DOE sponsored coordinating group on alternative techonologies which is working in conjunction with the Electric Power Research Institute. IDNS is also holding an international symposium on alternative technologies in late February, 1986, to examine further the technologies being used or under development in several other countries and the technologies being proposed by developers in this country.

With respect to licensing criteria, the State of Illinois will soon be applying to become an Agreement State, with IDNS to be designated as the licensing authority for the disposal facility. IDNS's regulations must be compatible with the NRC's, but they may be more stringent. In 1987, we expect to establish the regulatory framework within which the technology will be chosen, begin the licensing process in 1989, and have the facility licensed by the end of 1992.

QUESTION 7:

You have requested that the Congress consider reducing the surcharges by 50 percent in the early part of the transition period. Would you elaborate on the impact of such a reduction in relation to incentives? Why would a 50 percent reduction still be a strong incentive for the generator to reduce the amount of low-level waste sent for disposal?

ANSWER:

There has been a four-fold increase in the cost of low-level waste disposal over the past 5 years. Every indication is that these costs will continue to increase significantly in the future. Such increases, even without surcharges, have already created significant incentives for generators to reduce the volume of low-level waste sent for disposal. Imposing significant surcharges over and above these increased costs could have the deleterious effect of encouraging improperly planned interim storage. The effect of short-term surcharges as an incentive is also questionable because of generators' limited ability to take further actions quickly.

If a reduction in surcharges is not possible, an acceptable alternative would be to rebate a portion of those surcharges (if milestones are met) to those states developing low-level waste facilities. These rebates could then be used for siting, development and operation of new disposal facilities.

Central Interstate
Low-Level Radioactive Waste
Compact Commission

Chairman
L. Hall Bohlinger, Sc.D.
Louisiana

Raymond J. Peery
Executive Director

October 23, 1985

Honorable Pete V. Domenici
Chairman, Subcommittee on Energy
Research and Development
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

The Commission is in receipt of your letter of October 16, 1985 requesting that we respond to a set of follow-up questions.

It is my pleasure to enclose the Commission's response to your questions. Should you require any further information from the Commission, please feel free to contact us at any time.

Sincerely,

Raymond J Peery

Raymond J. Peery
Executive Director

Enclosure

Responses of the Central Interstate
Low-Level Radioactive Waste Compact Commission
to follow-up questions submitted by Senator Pete V. Domenici
Hearing on Low-Level Waste

Question 1: How do you envision monitoring the adherence to milestones? Who should administer and enforce such work?

Response: Parts 1&2 The Commission recommends that adherence to the milestones should be monitored jointly by the United States Department of Energy, and a committee composed of delegates from sited and unsited regions.

Question 2: Each of the Compacts now before Congress contains a "severability clause" that allows any provision of the Compact to be severed if it is contrary to the Constitution or some federal or state law, without invalidating the remainder of the Compact provisions. With that clause in mind, and considering the provisions of S. 1578 that preserve the Federal government's jurisdictions, do you foresee of any circumstance under which these Compacts would have to be sent back to the states for re-ratification?

Response: As a general principal, the Commission does not foresee a circumstance for which the Compact would have to be sent back to the states for re-ratification if the language contained in S. 1578 is enacted. The Commission does, however, have concerns about language presently contained in Mr. Markey's substitute for H.R. 1083. Specifically, the provision relating to emergency access is so broad in its applicability that the states, in order to accept the provision, could possibly be required to submit the Compact for re-ratification.

Question 3: Would further technical assistance from DOE significantly reduce the time required to develop a disposal site in your state?

Response: If the Central States are to develop a disposal facility in a timely manner it is imperative that DOE continue to provide technical and monetary assistance to the region. The states are not in a position to provide the funding that is necessary to ensure the development of a disposal facility. We understand that the Administration is calling for a reduced effort by DOE. We believe this approach is short-sighted. DOE should be increasing its efforts in this area rather than curtailing them.

Question 4: Do you think that rebating surcharge funds back to states through DOE grants and assistance, rather than directly back to the states, would provide a greater assurance that the money would be applied where it is needed the most?

Response: DOE should have no part in the process of surcharge rebates. Surcharge rebates should go directly to the Compact Commissions and single states going-it-alone. If the rebates were to go to DOE the process for insuring that the Compacts receive the necessary funding could be overly lengthy. In addition, given past history, it is not guaranteed that the money would be spent on the purpose for which it is most needed. Such an approach is unacceptable to the Commission.

While the Commission recommends that rebates go directly to Compact Commissions and go-it-alone states, the Commission further recommends that the Congress specify that such rebates be used for siting and facility development purposes.

Question 5: What kinds of local incentives does your region plan on using to gain greater public acceptance of a low-level waste facility in that particular community?

Response: At this time, the Commission is not prepared to specify the local incentives the region will use to gain public acceptance of a low-level radioactive waste facility in a particular community. The Commission is currently accessing a number of incentives, both monetary and otherwise, and will develop a policy within the next year.

NELRAD
A Consortium of Radioactive Materials Users.

October 25, 1985

Honorable Pete V. Domenici
Chairman, Subcommittee on Energy
Research and Development
U.S. Senate
Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator Domenici:

It was a privilege to be part of the Subcommittee hearing scheduled on the LLW issue on October 8. Testimony was well prepared and yielded thoughtful comments for your deliberation. Even more importantly, Subcommittee members' comments and questions showed overall appreciation of the issue and serious intent to provide practical resolution.

I am pleased to enclose answers to your recent questions. The questions reflect both your overall understanding of the issue and its impact on radioactive materials use and your careful attention to detail.

We are encouraged that Congressional action continues to move steadily on this issue, and we are confident that we will reach resolution this year. Again, we offer the resources of our organization and member companies and institutions. If there is a way for us, or a counterpart organization in another region, to be helpful, please call 617-350-9023.

Sincerely,

NELRAD

Janis D. Stelluto

Janis D. Stelluto
Executive Director

Answers to
Follow-up Questions for Ms. Janis Stelluto
Executive Director, NELRAD

1. a) We agree that DOE has capability to make this allocation, and if their role is confined to decision-making, we concur with your conclusion. However, we strongly prefer to confine commercial waste disposal to commercial facilities and urge that DOE should not take responsibility for the waste.

   b) We agree with this perceptive observation that "Technologically feasible" is an unrealistic requirement. We concur with the cost effective condition and add that radiation safety might be an additional criterion. Mr. Udall's version is a practical approach:

UDALL024

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"(i) VOLUME REDUCTION AND SURCHARGES.--*Any low-level radioactive waste delivered for disposal under this section shall be reduced in volume to the maximum extent practicable and shall be subject to surcharges established in this Act.*

2. a) Mr. Markey's bill removes this provision for assignment and is silent on further mechanisms, leaving arrangements subject to assignment by state/facility regulation, geographic convenience, and individual contracting. We prefer this approach, allowing geography and market forces to prevail.

   b) The volume caps and limits provide assurances and controls. From there, geographic proximity should be the determining factor.

3. Surcharges and penalties imposed on radioactive materials users will have only uncertain and indirect effect on state and regional program. The assumption appears to be that the high cost of disposal will be an incentive for radioactive materials users to keep the issue alive in the consciousness of state and regional officials. We suggest that our past and present efforts to advocate resolution of this issue, have not been effective in encouraging decisive action by those officials.

   We urge that amendments include incentives to state and regional programs to move toward providing for new disposal facility development. At the same time, we urge that penalties for failure to comply with federal expectations should be extracted from the parties responsible - states and/or regional programs.

Our own October 8 testimony offered suggestions to provide those mechanisms and are included below:

Testimony of Janis D. Stelluto:

We believe that these costly surcharges should serve multiple purposes. We understand that they are proposed as incentives to waste volume reduction and disincentives to delay new facility development. However, the radioactive materials users pay the full cost, without penalty to state/regional programs.

We urge that both surcharges and penalties for failure to comply with program milestones be tied to state/regional programs and offer the following suggestions as possible means:

1. State of origin of the waste to collect surcharge on waste shipped, to be held in escrow to apply to new facility development within that state/region - may be used only after state/region has demonstrated that the most recent milestone has been met.

2. If state/region fails to meet meaningful milestones, amount in escrow fund to be forfeited to sited states to open negotiation for the agreed continued access.

3. If state/region fails to meet meaningful milestones, the amount of penalty be paid by the state of origin, in addition to forfeiting the surcharge amount.

Surcharges and Penalties

We view this provision of the amendments as the key to success, and as suggested in our testimony suggest that the surcharges be used to modify behavior on the part of states and regions.

We further suggest that if the state of origin of the waste collects the surcharge and then pays the sited state for the privilege of continued access, the message of responsibility is clear. Conversely, the rebate concept allows states of origin to perceive reversed roles.

Although states argue that they have difficulty dedicating funds, we suggest that a way of doing so is not impossible. I attach proposed Massachusetts legislation that allows money to be set aside for specific use.

From there, we suggest that the suggested penalties for failure to comply with Milestones of progress should be paid by non-sited states and regions. States taking possession of the waste or paying the cash penalty have both been recommended. Both methods deliver the proper message.

4. A 55 gallon drum contains approximately 7.5 cubic feet of waste. At $20/cubic feet, the surcharges on one drum is $150; at $40/cubic foot, the surcharge is $300 per drum. These anticipated surcharges are in addition to disposal and transportation costs, which currently are about $300 per drum. The $40 surcharge would double the current cost.

5. It is difficult to estimate the costs of volume reduction, which vary with different technologies, waste types and form and are driven by economies of scale.

   A standard industrial compactor can be purchased on today's market for about $5000. At that cost a compactor would pay for itself in the first year, for all but the very small waste amounts. At four to one compaction rates, twenty drums of waste will be reduced by fifteen drums. At the current disposal costs the compactor investment is paid back in the first year; if the cost of disposal doubles, pay bank is in six months.

   Incineration costs are much harder to assess. If an incinerator is already available, the advantage of greater use are obvious as the marginal costs are negligible. However, the installation costs are much higher than those for a compactor, and include large investment in design, local permitting, equipment and installation. New investments in incineration are not practical for small amounts of waste, and are not likely to be attempted by individual companies.

6. Most companies and institutions with waste to ship have found on-site storage to be second to compaction in cost savings, with total costs ranging from $120 to 300 per drum. However, cost savings vary with location and cost of additional space. A metropolitan medical center will probably find the cost of space prohibitive.

7. Expeditious review by NRC is probably difficult to legislate at the NRC end. Procedures for license application require technical testing and long-standing administrative procedures. Although some of the review step might be shortened, the process of changing the procedures in itself would engender resistance and require a great deal of time.

   NRC encourages license applicants to begin communication with their offices early in the application process. Legislation might reinforce this advice by including more the one milestone that deals with license application. For example: a 1989 milestone that requires a preliminary plan to be filed with the licensing agency, followed by the proposed 1990 milestone that requires that complete application.

   Good faith by NRC and good understanding and communication by state programs and developer/operators are probably the most effective means of expeditious license approval.

QUADREX

Quadrex Corporation

1700 Dell Avenue Campbell California 95008-6986
408-866-4510 TWX 910-590-2436 TELEX 35-2031 TELECOPY 408-370-439

Sherman Naymark
Chairman

October 23, 1985

The Honorable Pete V. Domenici
Chairman
Subcommittee on Energy Research and
Development
Committee on Environment and Public Works
United States Senate
Washington, D.C. 20510

Dear Senator Domenici:

This letter responds to the two questions contained in your October 16, 1985 letter.

QUESTION 1

> How does your recycling facility deal with mixed wastes such as scintillation vials? Are you regulated in any way by EPA's RCRA requirements? In processing and/or recycling scintillation vials or other wastes, do the hazardous waste remain with the radioactive wastes, or are they separated out to a different waste stream?

ANSWER TO QUESTION 1

> Quadrex HPS Inc. operates a facility at Gainesville, Florida, which processes liquid scintillation vials (LSVs) to reclaim the flammable values of the toluene and xylene fluids for beneficial reuse. Quadrex receives liquid scintillation vials from brokers who directly market the medical facilities which create these mixed wastes. The process used mechanically crushes and screens the LSVs to separate the radioactive material and toxic xylene and toluene from the crushed glass and plastic. After rinsing with a proprietary solvent the crushed glass/plastic is able to be buried without restriction in a convenient land fill site. No regulation is necessary for these cleaned materials since it is neither radioactively contaminated nor contaminated with toxic material.
>
> The solvent and toxic chemicals, including any radioactivity, are stored, and then burned in a rotary kiln facility. This facility is not owned by Quadrex but is regulated by the State of Florida and EPA. Since there is no burial of the radioactivity and toxicity excepting for a negligible ash left over from the burning in the kiln our disposal processes are not regulated by the EPA's RCRA requirements.

Effluents from the kiln are monitored and are below EPA allowable discharge levels. There is no separate waste stream created from the radioactive waste and the toxic waste. We feel our process is a very ecologically sound one in that nothing need be buried thus avoiding the mixed waste burial dilemma.

QUESTION 2

I would assume that any waste recycled at your facility would be transported to the disposal site assigned to the original generator of such wastes.

a) How are these wastes identified and kept separate from another generator's wastes?

b) How does your suggested amendment language ensure that the recycled waste goes to the proper disposal site? It seems to me that your language gives you the ability to ship to any disposal site after you've processed the waste. Is that your intent?

ANSWER TO QUESTION 2

a. Quadrex operates an LLRW decontamination facility at Oak Ridge, Tennessee. This facility decontaminates and volume reduces metallic wastes received primarily from operating nuclear power plants. When Quadrex set up its management information system, in order to be able to accurately project and track costs, this system took into account client input by volume. Incoming shipments to Quadrex are thoroughly checked by our health physicists in order to assure that the shipping document accurately reflects the volume and amount of radioactive material received from each client. Each incoming shipment is assigned a client job number. The system tracks transfers from the storage yard to the production facility. Batch processing is performed on waste by client job order and a specific transfer is then made of both salvageable material and waste produced during the batch processing. The waste stream and the recycleable material are also tagged by the same incoming client job number.

b. The suggested amendment language does not address the issue of where the radioactive waste will go and to which of the disposal sites. It is possible, for example, for Quadrex to separate the radioactive wastes which are processed into three separate shipments, one for each of the now operating low level radioactive waste disposal facilities, which shipment would contain waste generated by utilities assigned to that particular site with a listing of the waste amounts by client.

Quadrex believes that this is an inefficient way of handling the disposal of low level radioactive waste and has entered into discussions with the law firm of Sutherland, Asbill & Brennan, Washington, D.C., which firm represents the Governors of Nevada, Washington and South Carolina concerning low level radwaste waste burial.

Quadrex has proposed that the low level radioactive waste from all generators processed by Quadrex be consolidated into packages and buried in one of the three burial sites. An administrative credit arrangement will be given to the "nonused" burial sites. Quadrex would of course assure that the surcharges and allocations would be credited to the appropriate burial site based on the original generator of the radwaste.

This suggestion has been made for two reasons, 1) administrative economy and 2) to cut down on the number of transportable events which must transpire within any given year. The fewer the number of radioactive shipments, the more the transportation safety on the nation's highways. Wright Andrews, as attorney for the Governors of South Carolina, Washington and Nevada, has been receptive to this suggestion. Discussions are underway with the Governors of the burial states regarding this matter.

However, Quadrex again will stress that it is possible to discreetly separate the radioactive waste product by assigned burial site should this prove to be necessary.

Very truly yours,

Sherman Naymark

SN:DEO:sp
DEO.109

APPENDIX II

Additional Material Submitted for the Record

ERNEST F. HOLLINGS
SOUTH CAROLINA

OFFICES
1835 ASSEMBLY STREET
COLUMBIA, SC 29201
803-765-5731

103 FEDERAL BUILDING
SPARTANBURG, SC 29301
803-585-3702

126 FEDERAL BUILDING
GREENVILLE, SC 29603
803-233-5366

112 CUSTOM HOUSE
200 EAST BAY STREET
CHARLESTON, SC 29401
803-724-4525

233 FEDERAL BUILDING
FLORENCE, SC 29503
803-662-8135

United States Senate
125 RUSSELL OFFICE BUILDING
WASHINGTON, DC 20510
202-224-6121

COMMITTEES
COMMERCE, SCIENCE, AND
TRANSPORTATION: RANKING DEMOCRAT
APPROPRIATIONS
STATE, JUSTICE, COMMERCE, AND
THE JUDICIARY: RANKING DEMOCRAT
DEFENSE
LABOR, HEALTH AND HUMAN SERVICES,
EDUCATION
ENERGY AND WATER DEVELOPMENT
INTERIOR
BUDGET
INTELLIGENCE
DEMOCRATIC POLICY COMMITTEE
OFFICE OF TECHNOLOGY ASSESSMENT
NATIONAL OCEAN POLICY STUDY

October 8, 1985

Honorable Pete V. Domenici, Chairman
Subcommittee on Energy Research and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Pete:

I want to thank you and Alan for holding today's hearing on low-level nuclear waste legislation. I regret that other business prevented me from testifying before you, but I would like to take this opportunity to present my views regarding this urgent issue.

I would like to emphasize two fundamental points.

First, and most important, South Carolina will make no more concessions. My state truly has gone as far as it will on this issue of low-level nuclear waste.

In the interest of getting a settlement, Governor Riley and the governors of Washington State and Nevada have made major concessions. This has not been easy for us to swallow; anger runs deep because other regions of the country have failed to live up to their obligations under the 1980 Low-Level Radioactive Waste Act and because these regions still expect us to take their nuclear garbage. But the three states, in cooperation with many governors, have now developed a compromise proposal that is more than fair to everyone. But that's it. That's as far as South Carolina will go. Governor Riley has gone on record as saying that any attempts by other parties to weaken this agreement will lead us to scrap the entire deal. He will shut down our low-level waste facility, if necessary. I and the other members of our Congressional delegation fully support him.

I would therefore respectfully urge you, as the Chairman of the Energy Research and Development Subcommittee, to resist the efforts of anyone who would seek to weaken or alter this compromise package. I am pleased that many utility executives and others now support the proposed legislation. But I worry about further tinkering. This compromise remains very fragile. Last minute changes could destroy it.

Second, I would urge you to devote special attention to the "milestones" in this proposal. These requirements would link continued access to our three sites with demonstrated progress by states in the unsited regions. These requirements are of the utmost importance, not just to the three states with waste facilities, but also to the Congress and the country as a whole. They are the best guarantee we have that the Congress will not have to face another low-level waste crisis. In 1980, we thought that the new Low-Level Waste Act would be sufficient to get each region of the country to develop its own disposal capacity. We were wrong, and this year we face another crisis.

The only way to prevent this problem from occurring again in another seven years is to ensure that every state has strong incentives to handle its own problem. I don't think any of us in Congress want to face this problem again. Strict milestones, coupled with hefty surcharges, will help ensure that this problem does not come back to haunt us yet again.

I appreciate this opportunity to present my views for the record. I also want to thank you for your leadership in helping to solve this difficult political problem.

With warmest regards, I am

Sincerely,

Fritz Hollings

Ernest F. Hollings

EFH:pwa

OFFIC... FILE
PLEASE RETURN

State of North Dakota
OFFICE OF THE GOVERNOR
BISMARCK, NORTH DAKOTA 58505
(701) 224-2200

GEORGE A. SINNER
GOVERNOR

SENATE COMMITTEE ON ... OCT 7 1985

October 4, 1985

The Honorable James A. McClure, Chairman
Committee on Energy and Natural Resources
SD-358 Senate Office Building
Washington, D. C. 20510

Dear Senator McClure:

Please be advised that I support the "Governor's Compromise" transition package on low-level radioactive waste compacts.

I am opposed to amendments that would in any way distort the well thought out and carefully crafted balance the compromise represents.

I would appreciate your favorable consideration of this compromise.

Sincerely,

George A Sinner

George A. Sinner
Governor

GAS:JSC:das

cc: Members, Senate Committee on Energy and Natural Resources
Members, Senate Committee on Environment and Public Works
Members, House Committee on Energy and Commerce
North Dakota Congressional Delegation

OFFICIAL COMMITTEE FILE
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SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
OCT 10 1985

JOHN V. EVANS
GOVERNOR

OFFICE OF THE GOVERNOR
STATE CAPITOL
BOISE 83720

October 7, 1985

The Honorable James A. McClure, Chairman
Senate Committee on Energy and Natural Resources
SD-358 Senate Office Building
Washington, D.C. 20510

Dear Jim:

On October 8, your Committee is meeting jointly with the Committee on Environment and Public Works to hear testimony on Senate Bill 1578, Amendments to Low-Level Radioactive Waste Policy Act. For the record, I strongly support these critical amendments which will allow continued access to the currently operating disposal sites through 1992. These amendments reflect a significant compromise on the part of all states and are vigorously supported by my fellow Governors.

Although relatively little low-level waste is generated in Idaho, our state is significantly impacted by this legislation because of the high volumes of waste transported through Idaho enroute to the Hanford site. Idaho has been an active member of the Northwest Interstate Compact for Low-Level Waste Management and was the first state to pass authorizing legislation to join such a compact. The Northwest has shown outstanding leadership in setting guidelines and procedures for acceptance of waste beyond January 1, 1986, in anticipation of Congressional approval of this "Governors' Compromise."

The key elements of the amendments must not be fundamentally changed as proposed by certain utilities and interest groups. The compromise was designed to fairly accommodate volumes of waste from regions yet unable to provide adequate disposal capacity, and still maintain the incentives certain states need to progress toward regional low-level waste management. These incentives -- volume limitations, surcharges, waste generation reduction, and regional siting timetables -- must not be removed or weakened or else progress towards regional siting and acceptance of regional responsibilities will not be forthcoming.

Since 1980, significant progress has been made to manage low-level wastes through regional cooperation and action. My fellow Governors have shown vision, leadership and determination in accepting this major responsibility. Congressional approval of the regional compacts and the necessary transition period is the most critical point yet reached in the legislative process. I urge you to recognize state authority in this area and the progress states have made to date in implementing the Low-Level Waste Policy Act of 1980.

Regional management of low-level wastes must be reinforced by Congress at this important juncture with your Committee's support of regional legislation and the "Governors' Compromise" transition package. I appreciate the leadership you have provided on this issue, and sincerely hope to have your Committee's support.

Sincerely,

John V. Evans

JOHN V. EVANS
GOVERNOR

JVE:jjj

cc: Senator Steven D. Symms
Representative Richard Stallings
Representative Larry E. Craig

EXECUTIVE OFFICE
STATE OF MISSOURI
POST OFFICE BOX 720
JEFFERSON CITY, MISSOURI 65102

JOHN ASHCROFT
GOVERNOR

October 15, 1985

The Honorable Pete Domenici
United States Senator
SD-434 Dirksen Senate Office Building
Washington, D. C. 20510

Dear Senator Domenici:

Thank you for the opportunity to present our views on S. 1517 and S. 1578. While other state business prevented me from personally delivering my testimony on October 8, I am pleased to submit our position for inclusion in your hearing record.

We strongly believe that there are certain provisions of the legislation now before Congress that require close scrutiny and reconsideration. Specifically, the issues of surcharges and penalties in S. 1578, and the proposal that would codify single state exclusionary authority embodied in the House legislation, deserve thorough analysis by your Subcommittee.

We are concerned that the Congress has not given sufficient attention to the national fiscal implications of the legislation currently under consideration. The continuing unnecessary proliferation of waste management regions and independent states, and the potential for further deterioration of interstate cooperation will bring high costs and runs counter to the public interest.

We appreciate your efforts to develop a safe and economical system for the management of this nation's low-level radioactive waste.

Respectfully submitted,

John Ashcroft
GOVERNOR

crm

Enclosure

EXECUTIVE OFFICE
STATE OF MISSOURI

JOHN ASHCROFT
GOVERNOR

TESTIMONY OF
GOVERNOR JOHN ASHCROFT

to the
Senate Subcommittee on Energy
Research and Development
and the
Senate Subcommittee on Nuclear Regulation

October 8, 1985

Chairman Domenici, Chairman Simpson, Members of the Subcommittees, thank you for this opportunity to testify on S. 1517 and S. 1578. The effort to establish a workable system for managing low-level radioactive waste in the United States must take into account the views of the non-sited regions and independent states.

The State of Missouri has taken action to meet the Congressional mandate of P.L. 96-573. After completion of negotiations with Midwest Compact states, legislation was adopted by the Missouri General Assembly in 1983 allowing Missouri to join the Compact. Missouri participates in the Midwest Compact Commission as a member in good standing along with Indiana, Iowa, Michigan, Minnesota, Ohio and Wisconsin. The Commission is now moving forward with the development of a management plan that will lead to the identification of a host state in which a disposal facility is to be located.

Missouri has acted in good faith to respond to the will of Congress, but at this juncture we must point out several key problems that have become obvious over the last year. The intent of Congress to encourage the development of reasonable, economically viable waste management regions has faltered. Instead of the six well-structured compact regions portrayed on maps reviewed by Congress in 1980, we now see the states "disorganized" into at least fourteen separate regions or independent states with continuing uncertainty plaguing the Northeast. The effect of this fractionation will be to increase the costs of disposal drastically due to the high fixed costs of characterizing, licensing and developing a site regardless of the size of the waste stream the facility is intended to handle.

P.O. BOX 720 JEFFERSON CITY, MISSOURI 65102

Nationally, the proliferation of waste management regions will add more than $100 million to the costs of securing disposal facilities. There will also be collectively much higher costs for monitoring and post-closure care. In order to avert a further deterioration of this nation's low-level radioactive waste management efforts, it is vital that the Congress continue to recognize that disposal activities can be most safely and efficiently managed on a regional basis. Initiatives now before the House to codify single state exclusionary authority would work to the detriment of cooperative regional efforts and should be opposed.

The issue of surcharges continues to trouble us. Under the provisions of S. 1578, surcharges collected from the generators of 31 states could total over $250 million. The revenue from these taxes would be channeled to the treasuries of the three current host states with no guidance or direction as to the use of these monies. We see this as a significant transfer of wealth from 31 states to three with very little justification. Surcharges are already being collected for site regulation and post closure care. With the Barnwell, South Carolina disposal site scheduled to cease operating as a regional facility in 1992, there exists as great a need for incentives to choose a host state and proceed with site selection in the Southeast Compact region as in the Midwest Compact region. In the application of this tax, the absence of a rational basis for discriminating between generators in Missouri and for instance, Tennessee, provides fertile ground for equal protection litigation. The low-level radioactive waste issue does not need and probably cannot bear additional legal uncertainties.

Both the surcharge schedule and the total revenue are set at an unnecessarily and unreasonably high level. The volume caps, milestones and penalties which include a ban on disposal access provide sufficient pressure on the non-sited regions to move forward with site selection and licensing activities. An equitable approach would be to reduce the level of the surcharges and apply the assessment equally to all generators of low-level radioactive waste in the United States. Not only would this reduce the potential for legal challenges, but above all, it would make the surcharge system fair.

But where should the surcharge collections be deposited? It is our firm belief that the most constructive approach would be to dedicate the entirety of the Congressionally authorized surcharges to the furtherance of developing safe and economical disposal facilities. The Midwestern Governors' Conference has taken the position that a special Department of Energy fund be created with specific direction for expenditures relating solely to the establishment of new disposal facilities. A simple rebate back to individual waste generating states as now embodied in House legislation is in concept a step in the right direction, but would likely not assist the states in meeting the mandate of Congress. The surcharge funds should be directly targeted to the effective management of low-level radioactive waste.

We suggest that on the matter of penalties, S. 1578 be amended to reflect the fact the milestones could be missed through no fault of a compact region or individual states. Regions and states should not be penalized if they can demonstrate having made a good faith effort to achieve milestones though they may fail due to actions beyond their control. Delays caused by litigation or the licensing process are often cited as examples of ways that milestones could be missed. Let us offer an illustration of another real possibility that under S. 1578 would unfairly impose penalties. Assume that a multistate compact region has selected a host state and the disposal facility license application has been submitted before the January 1, 1990 milestone. But then, if under mounting political pressure the selected host decided to withdraw from its compact and operate an independent state facility, the host state would not be subject to the penalties though all the remaining states in the compact would be. Clearly, the penalty section of S. 1578 needs reconsideration.

The points we have raised, if addressed, will improve the chances for the ultimate establishment of a safe and economical low-level waste management system for the nation. However, we still contend as we have in testimony earlier this year on H.R. 1083, that Congressional review of developments since the passage of P.L. 96-573 is absolutely essential but it has not been adequate. Decisions made by the Congress in these closing months of 1985 will have lasting repercussions nationwide. We respectfully request that a serious review be given to the safety, efficiency, economics and practicability of the system which is nearing adoption.

Atomic Industrial Forum, Inc.
7101 Wisconsin Avenue
Bethesda, MD 20814-4805
Telephone (301) 654-9260
TWX 7108249602 ATOMIC FOR DC

October 3, 1985

The Honorable Alan K. Simpson
Chairman, Subcommittee on Nuclear
Regulation
Senate Committee on Environment & Public Works
and
The Honorable Peter V. Domenici
Chairman, Subcommittee on Energy
Research & Development
Senate Committee on Energy & Natural Resources

Dear Senators Simpson and Domenici:

In response to a recent request by your staff, the AIF Committee on Radionuclides & Radiopharmaceuticals offers the following comments on the subject of your October 8 hearing.

Suppliers of radiopharmaceuticals for medical diagnosis, radiochemicals for scientific research, and radionuclides for modern industrial applications are vitally interested in the long-term availability of low-level waste disposal capacity. The Atomic Industrial Forum Committee on Radionuclides and Radiopharmaceuticals represents this broad constituency. In addition to supplier companies, direct customers are also seriously concerned about the low-level waste issue. Many were adversely impacted by the disruption in capacity availability in 1979, particularly hospitals and universities.

With passage of the Low-Level Waste Policy Act of 1980, responsibility for the availability of disposal capacity has shifted from the nationwide marketplace to individual states. Substantial progress has been made by many states and regions in living up to their responsibility. In the Congressional approval process for regional compacts, amendments to the 1980 Act have become necessary. Extensive parties have diligently striven to achieve a workable consensus in addressing outstanding issues. One key issue still under consideration involves defining the jurisdictional limits of EPA & NRC in mixed LLW/hazardous waste.

A recent survey conducted by Brookhaven National Laboratory on behalf of the NRC reveals that although mixed wastes containing organics amount to about 2-2.5% of the total LLW, they constitute 1/3 of the waste stream coming from academic and medical facilities. There is serious concern that while LLW disposal capacity for the great bulk of the nation's LLW is assured by compacts, individual state and congressional efforts, this small but important waste stream may be orphaned. It is further observed that the medical and academic community are in the poorest position to deal with this waste stream on site.

A leading proposal dealing with mixed waste would have EPA develop regulations (in consultation with NRC) governing mixed waste. It would also require that a LLW facility obtain a RCRA hazardous waste facility permit (from the NRC instead of the EPA) in addition to a LLW waste facility license.

Although this approach has some merit, the Committee believes the relationships identified above have been inverted. NRC now regulates and has always regulated the radioactivity content of mixed wastes. Radiotoxicity of such wastes has generally been considered the dominant hazard. Accordingly, such wastes have traditionaly been handled at LLW facilities. For the sake of continuity and consistency, the Committee highly recommends that NRC be tasked with re-evaluating the 10 CFR 61 waste form and site performance criteria, specifically considering the mixed waste streams (with the consultation of EPA). Any further regulations defining proper handling of mixed wastes should be issued by the NRC. Just as de minimis levels of LLW are to be defined by NRC, any new regulations should also provide for de minimis levels by hazardous waste constituents. Additionally, the Committee strongly recommends that any special requirements necessary to deal with specific hazardous waste constituents become NRC license conditions, not RCRA permit requirements. The Committee believes the dual licensing process (RCRA hazardous waste permit plus NRC low-level waste license) is counterproductive. It will only delay necessary siting efforts that can be adequately addressed in one omnibus facility licensing proceeding conducted by the NRC.

Development of sufficient environmentally and economically sound waste disposal capacity appropriately located throughout the United States is the underlying goal of the Low-Level Waste

Policy Act. The Committee supports that objective and urges prompt Congressional consideration of proposed amendments to the Act as well as consideration of compacts submitted for Congressional review.

We would appreciate this letter being entered into the record of the October 8 hearing.

Sincerely,

Henry H Kramer

Henry H. Kramer
Chairman, AIF Committee
on Radionuclides &
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HHK:wbb

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